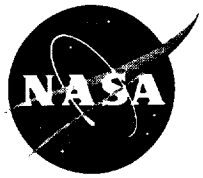
NASA/TM—2000–209891, Vol. 4



Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)

Forrest G. Hall and David E. Knapp, Editors

Volume 4

BOREAS AFM-3 NCAR Electra 1994 Aircraft Flux and Moving Window Data

D.H. Lenschow, A. Shanot, S.P. Oncley, and A.Cooper

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

June 2000

The NASA STI Program Office ... in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program Office plays a key part in helping NASA maintain this important role.

The NASA STI Program Office is operated by Langley Research Center, the lead center for NASA's scientific and technical information. The NASA STI Program Office provides access to the NASA STI Database, the largest collection of aeronautical and space science STI in the world. The Program Office is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- TECHNICAL PUBLICATION. Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.
- TECHNICAL MEMORANDUM. Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.
- CONTRACTOR REPORT. Scientific and technical findings by NASA-sponsored contractors and grantees.
- CONFERENCE PUBLICATION. Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.
- SPECIAL PUBLICATION. Scientific, technical, or historical information from NASA programs, projects, and mission, often concerned with subjects having substantial public interest.
- TECHNICAL TRANSLATION. English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that complement the STI Program Office's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results . . . even providing videos.

For more information about the NASA STI Program Office, see the following:

- Access the NASA STI Program Home Page at http://www.sti.nasa.gov/STI-homepage.html
- E-mail your question via the Internet to help@sti.nasa.gov
- Fax your question to the NASA Access Help Desk at (301) 621-0134
- Telephone the NASA Access Help Desk at (301) 621-0390
- Write to:
  NASA Access Help Desk
  NASA Center for AeroSpace Information
  7121 Standard Drive
  Hanover, MD 21076-1320

NASA/TM—2000–209891, Vol. 4

Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)

Forrest G. Hall and David E. Knapp, Editors

Volume 4

BOREAS AFM-3 NCAR Electra 1994 Aircraft Flux and Moving Window Data

Donald H. Lenschow
Al Shanot
Steven P. Oncley
Al Cooper
National Center for Atmospheric Research (NCAR)

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

June 2000

Available from:

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320
Price Code: A17

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Price Code: A10

BOREAS AFM-3 NCAR Electra 1994 Aircraft Flux and Moving Window Data

Donald H. Lenschow , Al Shanot, Steven P. Oncley, Al Cooper

Summary

The BOREAS AFM-3 team used the NCAR Electra aircraft data to make measurements of the fluxes of momentum, sensible and latent heat, carbon dioxide, and ozone over the entire BOREAS region to tie together measurements made in both the SSA and the NSA in 1994. These data were also used to study the planetary boundary layer using both in situ and remote sensing measurements. This data set contains both the aircraft flux and the moving window data. These data are stored in tabular ASCII files.

Table of Contents

1. Data Set Overview

1.1 Data Set Identification

BOREAS AFM-03 NCAR Electra 1994 Aircraft Flux and Moving Window Data

1.2 Data Set Introduction

The BOReal Ecosystem-Atmosphere Study (BOREAS) Airborne Fluxes and Meteorology (AFM)-03 team used the National Center for Atmospheric Research (NCAR) Electra aircraft data to make measurements of the fluxes of momentum, sensible and latent heat, carbon dioxide, and ozone over the entire BOREAS region to tie together measurements made in both the Southern Study Area (SSA) and the Northern Study Area (NSA). These data were also used to study the planetary boundary layer using both in situ and remote sensing measurements. This data set contains both the aircraft flux and the moving window data. These data are stored in tabular American Standard Code for Information Interchange (ASCII) files.

The fluxes and statistics archived here are for passes or segments of passes between pre-defined

waypoints, as part of various flight patterns (see Section 5). The times and distances for the regular flux data varied depending on the aircraft speed and the distance between the waypoints. The shortest distance between waypoints is about 10 km. Included in these regular data are those from the grid patterns and the Candle Lake runs. The passes for the grid patterns (GS, GN) are 32 km in length. The Candle Lake (CS) runs were divided into two segments, one over the relatively homogeneous Old Aspen (OA)area surrounding the OA flux tower (east end of CL run), and the other over the area at the west end of the run dominated by black spruce. The moving window data represent 40-kilometer averages for overlapping portions of the flight passes. Each segment progresses 10 km along the flight path and overlaps the previous segment by 30 km.

1.3 Objective/Purpose

The Electra aircraft data were used to make measurements of the fluxes of momentum, sensible and latent heat, carbon dioxide, and ozone over the entire BOREAS region to tie together measurements made in both the SSA and NSA. They were also used to study the planetary boundary layer using both in situ and remote sensing measurements.

1.4 Summary of Parameters

Altitude
Wind Direction
Wind Speed
Air Temperature
Potential Temperature
Water Mixing Ratio
U Component Wind Velocity
V Component Wind Velocity
Static Pressure
Surface Radiation Temperature
Downwelling Total Radiation
Upwelling Total Radiation
Downwelling Longwave Radiation
Upwelling Longwave Radiation
Net Radiation
Upward Photosynthetic Photon Flux Density (PPFD)
Downward PPFD
Auxiliary Radiation Sensor
Greenness Index
CO2 Concentration
O3 Concentration
CH4 Concentration
Scaled Radiance Measurements from a Satellite Simulator Sensor

Additional columns include information about the standard deviation, kurtosis, and trend of the parameters listed above.

1.5 Discussion

The Electra aircraft data were used to make measurements of the fluxes of momentum, sensible and latent heat, carbon dioxide, and ozone over the entire BOREAS region to tie together measurements made in both the SSA and the NSA. They also were used to study the planetary boundary layer using both in situ and remote sensing measurements. This data set contains the aircraft flux data. These data are stored in tabular ASCII files.

1.6 Related Data Sets

BOREAS AFM-01 NOAA/ATDD Long-EZ Aircraft Flux Data over the SSA
BOREAS AFM-02 King Air 1994 Aircraft Flux and Moving Window Data
BOREAS AFM-02 Wyoming King Air Aircraft Sounding Data
BOREAS AFM-03 NCAR Electra 1994 Aircraft Sounding Data
BOREAS AFM-04 Twin Otter Aircraft Flux Data
BOREAS AFM-04 Twin Otter Aircraft Sounding Data
BOREAS AFM-11 Aircraft Flux Analysis and Comparison PDF Documents

2. Investigator(s)

2.1 Investigator(s) Name and Title

Donald H. Lenschow
NCAR/MMM
P.O. Box 3000
Boulder, CO 80307-3000
(303) 497-8903
(303) 497-8181 (fax)
lenschow@ucar.edu

2.2 Title of Investigation

Airborne Investigation of Biosphere-Atmosphere Interactions over the Boreal Forest

2.3 Contact Information

Contact 1:

Al Shanot
NCAR/ATD/RAF
P.O. Box 3000
Boulder, CO 80307-3000
(303) 497-1063
(303) 497-1092 (fax)
schanotl@ucar.edu

Contact 2:
For leg-average statistics calculations:

Steven P. Oncley
NCAR/ATD/SSSF
P.O. Box 3000
Boulder, CO 80307-3000
(303) 497-8757
(303) 497-8770 (fax)
oncley@ucar.edu

Contact 3:
For disjunct sampler data:

Al Cooper
National Center for Atmospheric Research/MMM
P.O. Box 3000
Boulder, CO 80307-3000
(303) 497-8938
(303) 497-8181 (fax)
cooper@ucar.edu

Contact 4:
David Knapp
Raytheon ITSS
NASA GSFC
Code 923.4
Greenbelt, MD 20771
(301) 286-1424
(301) 286-0239 (fax)
David.Knapp@gsfc.nasa.gov

3. Theory of Measurements

A series of introductory monographs addressing the theory and practice of measuring atmospheric variables from a moving, aircraft platform may be found in (Lenschow, ed., 1986). An introduction to the general topic of eddy correlation fluxes may be found in Stull (1988).

4. Equipment

4.1 Sensor/Instrument Description

This section summarizes the capabilities of the Electra as used in BOREAS. For a complete description, see the Project Summary Documentation for BOREAS distributed by the National Center for Atmospheric Research (NCAR)/Research Aviation Facility (RAF) and associated RAF Bulletins.

Winds were determined by combining measurements of the air motion relative to the aircraft by pressure sensors connected to five holes on the radome of the Electra, with aircraft motion measured by a Honeywell laser inertial reference system (IRS). Corrections to the IRS data were made using measurements by a Global Positioning System (GPS) satellite receiver. See NCAR RAF Bulletin No. 23 for a complete description of this system and the data processing used.

In situ measurements of temperature, humidity, atmospheric pressure, and aerosol and cloud droplet size distributions were made by sensors mounted to the wing and fuselage of the aircraft (RAF Bulletin Nos. 22 and 24). In situ measurements of chemical constituents were made by drawing outside air into closed-path sensors within the aircraft cabin. These sensors included a LI-COR LI-6262 for water vapor and carbon dioxide and two NCAR gas-phase chemiluminescent sensors for ozone.

Radiometers were located on the top and bottom of the fuselage to measure sky and surface conditions. Broadband shortwave (visible) radiation, infrared radiation, and infrared temperatures were measured both upward- and downward-looking (RAF Bulletin No. 25). A custom instrument to measure the Normalized Difference Vegetation Index (NDVI) observed radiation from the surface at 650 and 862 nm (NCAR Technical Note TN-370+STR).

4.1.1 Collection Environment

See Section 4.1.

4.1.2 Source/Platform

Platform: Electra Aircraft

4.1.3 Source/Platform Mission Objectives

See Section 1.4.

4.1.4 Key Variables

See Sections 1.4, 1.5, and 7.3.

4.1.5 Principles of Operation
See Section 3.

4.1.6 Sensor/Instrument Measurement Geometry
None given.

4.1.7 Manufacturer of Sensor/Instrument
The following instruments were mounted on the Electra aircraft:

Airborne Data System
- Acquisition: Electra ADS (Motorola 68000 based), Exabyte Model EXB-8200 Tape Drives, (2 units)
- Display: Sun Model 3E120 Computer (2 units), Mitsubishi Model FL6605ADK 16" High Resolution Color Monitor (2 units), HP3630 Paint Jet Printer, Epson LQ-1000 Printer, Diamond Trackball (2 units) [S/N 12012263]

Aircraft Position, Velocity and Attitude
- Honeywell Model HG1095-AC03 Laseref SM IRS (1 unit). Forward cargo bay [S/N 176]
- Trimble TANS GPS

Static Pressures
- Rosemount Model 1501 Digital Pressure Transducer - Fuselage Port (PSFD) [SN/ 29]
- Rosemount Model 1201F2A Pressure Transducer - Left Wing Tip (PSW)
- Rosemount Model 1201F1 Pressure Transducer - Cabin (PCAB) [S/N 822]

Dynamic Pressures
- Rosemount Model 1221F1VL - Left Wing Tip (QCW) 1221F [S/N 149]
- Rosemount Model 1221F1VL - Radome (QCR) [S/N 148]
- Rosemount Model 1221F1VL - Fuselage (QCF) [S/N 659]

Temperatures
- Rosemount Type 102 Non-deiced Sensor -- Rosemount Model 510BF Amplifier - Radome Mount (TTB) 102EAL [S/N 2981]
- NCAR Reverse Flow Temperature Probe -- Rosemount Model 510BF Amplifier - Fuselage Mount (TTRF) S-1088 [S/N 17]

Dew Point and Humidity
- EG&G Model 137-C3 Dew Point Hygrometer - Starboard Fuselage Mount (DPB) [S/N 807/483]
- General Eastern, Model 1011B Dew Point Hygrometer - Starboard Fuselage Mount (DPT) [S/N 1959/11801]
- NCAR Model LA-3 Lyman-alpha Hygrometer - Radome Mount (VLA) Pathlength set at 0.5 cm

Flow Angle Sensors, Radome
- Attack - Rosemount Model 1221F1VL Differential Pressure Transducer (ADIFR) [S/N 1177]
- Sideslip - Rosemount Model 1221F1VL Differential Pressure Transducer (BDIFR) [S/N 1176]

Cloud Physics
- Particle Measuring System Model PCASP, Right Wing Tip [S/N 108]
- Particle Measuring System Model FSSP-100, Left Wing Tip [S/N 122]
- PMS-King Liquid Water Countent, Right Wing Tip
- Aerosol Concentration, CONCN, TSI Model 3760, Heise transducer [S/N 623]

Radiation Fluxes

- Remote Surface Temperature, Barnes PRT-5, Downward looking (RSTB) [S/N 423]
- Remote Sky Temperature, Barnes PRT-5, Upward looking (RSTT) [S/N 385]
- NCAR/RAF Vegetation Meter, Downward looking, 650 and 862 nm (WV650, WV862) [S/N 101]
- Ultraviolet Irradiance, RAF Modified Eppley Model TUVR Pyronometers, 2 units: Upward looking (UVT) [S/N 24127], Downward looking (UVB) [S/N 24128]
- Shortwave Irradiance, 2 units: upward looking(SWT) [S/N 12149F3], downward looking (SWB) [S/N 12148F3]
- Infrared Irradiance, Top (IRTC) [S/N 12151F3], downward (IRBC) [S/N 12150F3]
- Remote Surface Temperature (XKT19) Heimann Model KT19-85 [S/N 305]

(BOREAS II period)

Geometric Altitude

- Collins Model ALT 55 B Radio Altimeter - Fuselage Mount, 0 to 800 m AGL (HGM)
- Steward-Warner Model APN-159 - Fuselage Mount, 100 to 12,000 m AGL (HGME)

Photography

- GE Model 1CVK5040 Video Camera and Recorder - Color Camera, forward and leftside facing units, with Date/Time Recording
- Video Camera and Recorder - Color Camera, downward looking with Date/Time Recording

Air Chemistry

- NCAR Modified TECO Model 49 Ozone Analyzer [S/N 49-22262-204] (TEO3, TET, TEP, TEO3C)
- LI-COR Model LI-6262 CO_2 Analyzer [S/N IRG-262] (XCO2F, XCO2S, XLH2OS, XLCO2)
  - XCO2P; Rosemount No. 1201, [S/N 632]
  - XCO2RP; Rosemount No. 1201F, [S/N 974]
  - CO_2 pump KNF Newberger Model No. 35.2STR [S/N 120619]
  - CO_2 pump Pac. 5a 24Vdc Model BA3628-7012-9-56RC [S/N 9321009613]
- Fast (NO chemiluminescence) Ozone (XO3FIS, XO3FIN, O3FIF, XO3FC) Temp controller Omega Model CN 320-P2C [S/N 860037AC] Pressure transducer MKS Model 122AA-0100AB [S/N 15700-2] NO monitor Interscan 2000-Model 2150 [S/N 46007]
- CCN Counter TSI Model 3760 [NSF - 21089] with Heise transducer [S/N 623]
- CO Analyzer (gas filter correlation) (CMODE, CO) TECO Model 48 [NSF 23889]
- Aethalometer (Black Carbon) Magee Scientific Model AE-9 [NSF 23162]
- Nephelometer, Radiance Research Model M902

User-Supplied Equipment

- DLR DIAL Lidar (See attached list)
- Intermittent Sampler System -- PPE4389, Parameters: XISSFL Rosemount pressure transducer [S/N 1217456], XISSAPR 142pc 30a pressure transducer [S/N 001], XISSBPPR 142pc 30a pressure transducer [S/N 023], XISPLPR 142pc 30a pressure transducer [S/N 009], XISCO2P 142pc 30a pressure transducer [NSF 18857]

System includes

a. EDDY Accumulators
b. Pump Tray
c. Valve Tray
d. Sampler Line
e. Electronics Box
f. Laptop Computer (TI 4000 win SX) [S/N 127A231072]
CSI Hydrocarbon Analyzer, Model HC500-2C (NSF 23050) [S/N 14285]
Teco Model 49 Ozone Analyzer [NSF 24795]
Licor CO_2 Analyzer, Model 6251 (NSF 24078) [S/N IRGN-225]
Lyman Alpha Hygrometer [S/N 05]
Cylinders: CO_2 SPAN [S/N JJ223844], CO_2 Zero [S/N CAL-10709], H_2 [S/N JJ235903]
Greenberg Can Sampler

4.2 Calibration

4.2.1 Specifications
None given.

4.2.1.1 Tolerance
None given.

4.2.2 Frequency of Calibration
None given.

4.2.3 Other Calibration Information
None given.

5. Data Acquisition Methods

Note that BOREAS Information System (BORIS) staff compiled the following information in Section 5 from available BOREAS documents and believes it to be correct. However, no confirmation was received from Dr. Lenschow.

The straight-line, constant altitude passes used for the flux calculations were all parts of several different flight patterns uses throughout BOREAS-94. What follows here is a brief description of those patterns, including the short, two-letter identifier used for communications, labeling data files, etc.

ID	Description (second letter denotes NSA or SSA)
CS	Candle Lake runs, SSA only, usually along path a-d.
FS,FN	Flights of two (inter-comparison runs), various locations.
GS,GN	Grid patterns. Sequence of 9 evenly spaced, parallel flight lines, covering a 32- x 32-km square area (King Air), with lines oriented either east-west or north-south.
HS,HN	Stack patterns.
LS,LN	Transects of intermediate length (e.g., 100 km).
PS,PN	Budget box pattern (see Betts et al., 1990).
RT	Regional transect. For King Air, route used in transit between NSA and SSA. Coincide with Electra RTs.
TS,TN	Site-specific run at a TF (tower flux) site.

Navigation way-points used for flying the patterns are listed below. Positive latitudes indicate North and negative longitudes indicate West.

Pt.	Latitude	Longitude	
A	53° 32.0'	-106° 34.0'	
C	53° 37.8'	-106° 11.4'	(same as PANP-OA)
G	53° 55.6'	-104° 59.7'	
H	54° 07.0'	-104° 13.5'	
K	54° 41.7'	-103° 47.5'	
L	54° 57.3'	-101° 58.0'	
M	55° 54.8'	-99° 07.5'	
O	55° 53.2'	-98° 00.0'	
P	60° 30.0'	-98° 00.0'	
Q	60° 30.0'	-95° 30.0'	
R	59° 00.0'	-95° 30.0'	
CH	58° 44.5'	-94° 04.0'	(Churchill airport)
a	53° 34.7'	-106° 23.8'	
b	53° 42.8'	-105° 52.0'	
c	53° 55.0'	-105° 04.0'	
d	53° 59.0'	-104° 47.2'	
f	53° 59.8'	-104° 43.5'	
g	53° 32.0'	-104° 27.6'	
h	53° 56.8'	-105° 20.5'	
i	54° 03.7'	-104° 45.5'	
j	53° 43.8'	-104° 34.0'	
k	53° 35.8'	-106° 18.0'	
m	54° 05.2'	-104° 50.5'	
n	53° 32.2'	-104° 19.5'	
s	53° 17.0'	-105° 43.0'	
t	53° 38.0'	-105° 43.0'	
u	53° 17.0'	-105° 32.0'	
v	53° 43.0'	-105° 17.0'	

Centers of north and south KA grids:

North	55° 52.5'	-98° 31.5'
South	53° 51.5'	-104° 48.6'

Other locations:

NOAA radar	55° 56.0'	-98° 36.8'

6. Observations

6.1 Data Notes

The following instrument notes are formatted in blocks as:

Date Time, Universal Time Code (UTC)
Departure-Destination (CYXE is Saskatoon Airport, CYTH is Thompson Airport, CYYQ is Churchill Airport)
INS error
Notes and Comments

25 May 1994 15:54:12-21:55:54
CYXE-CYXE
S 1.0':W 3.5'
A transect flight over the southern and northern BOREAS study area. The flight tracks were through Prince Albert National Park, to the Thompson, Manitoba area. These legs were flown at 300' AGL. Two lidar runs over Candle Lake and on our return just north of Saskatoon. Both of these 12000 above ground level (AGL).
- TTB & VLA sampled at 5 sps & 1 Hz

26 May 1994 15:57:40-22:06:30
CYXE-CYXE
S 0.2':W 1.8'
Boundary layer mission with several legs above the base of 300' over Candle Lake. Eight lidar legs flown 9000 above mean sea level (MSL) altitude.
- CO_2 licor unit span is off 245 pre, 277 post.
- VLA & TTB sampled at 5 sps & 1 Hz filter.
- RSTB has drop-outs around 8 C.

31 May 1994 16:00:05-21:50:23
CYXE-CYXE
S 1.8':W 3.1'
This was a repeat of RF2. The mission was flown around Candle Lake, which included 8 lidar runs. PALT of various leg where conducted between 400 m to 3,600 m altitudes.
- XCO2S sensitivity was changed Gain 4, with offset.
- Lyman-Alpha failed to function.
- UVT drop outs (2x)
- RSTB drop outs

1 June 1994 15:53:01-22:39:39
CYXE-CYXE
S 1.6':W 2.4'
This was a transect flight from Thompson, the northern study area. Lowest altitude was 100 m AGL on 4 of the legs. Four lidar legs were sampled at 1 Km and 3 Km altitudes.
- MRLA lower sensitivity 1.0g/kg.
- UVT intermittent.

6 June 1994 15:05:05-22:04:35
CYXE-CYYQ
S 2.1':E 0.3'
This was a transect from Saskatoon to Churchill, Manitoba. The flight track started at 10,000, descend to point A, proceeded to fly at 300' to point L. Soundings at L to 10K', descended to 300', proceed to point P (passed Thompson). At point P, ascended to 10,000' to point Q, repeat at 6K, descend to 300' to point R. At point R, climbed to 10,000, did a set of maneuvers and descended to Churchill.
- XCO2T was disconnected.
- CONC ran out of butanol.

7 June 1994 14:31:07-20:51:25
CYYQ-CYXE
S 1.1':W 3.5'
This was the return research flight from Churchill. Similar in flight track; however, one of the northern legs over the tundra was eliminated. Further south, we made repeated passes through a forest fire plume.
- XCO2T inoperative
- CN Counter inoperative

10 June 1994 15:55:19-22:29:25
CYXE-CYXE
S 0.0':W 1.6'
Transect flight up to Thompson and back. Went out at 10500', sounding down, and 300' flux leg. No smoke plume study; smoke too diffuse. On way back, flew C.S. legs and then 300' flux leg. Sounding up to 10,000', and then back to Saskatoon at 8,000'.
- King Probe still not working properly
- Lyman-alpha, CO_2, and IS all appeared to work well.
- Fantastic lidar image of smoke plume.

13 June 1994 14:53:59-19:42:33
CYXE-CYXE
S 1.3':W 1.8'
Flight up to point A @ 300'; point A to point L for sounding to 6,500'; down, continued to point O and went up to 9,000' (sounding); @ 9,000', from 0 to 5 minutes past M; sounding down and continued to point L; continued @300' to Candle Lake; ascended to 9,000' and ferried back to Saskatoon.
- Licor CO_2 still drifting

20 July 1994 15:50:11-21:20:45
CYXE-CYXE
N 0.1':W 1.2'
Intercomparison research flight with Wyoming King Air. Flight plan in Flight File. Flight legs flown @ various altitudes. Formation flying with Wyoming King Air during 300 ft. transects.
- RSTB appears to be noisy first three hours.

21 July 1994 16:29:51-22:49:17
CYXE-CYXE
S 0.4':W 3.2'
Transect flight to Thompson, Manitoba and return.

24 July 1994 14:56:02-21:18:32
CYXE-CYYQ
S 0.9':E 2.2'
Transect flight from Saskatoon to Churchill, Manitoba.
*Final 30 min. of research abandoned due to pitch-locking of No. 3 propeller.

30 July 1994 15:20:53-22:37:51
CYXE-CYXE
N 0.8':E 3.5'
Transect flight to point Q (see diagram in flight file) and return.
- Lyman-alpha is not functional.
- RSTB performance questionable at times.

1 August 1994 15:57:51-21:25:25
CYXE-CYXE
S 2.6':W 1.8'
Repeated flight legs (@ various altitudes) over Candle Lake. See flight plan in flight file.

2 August 1994 15:49:16-21:47:26
CYXE-CYXE
S 2.0':W 3.5'
Repeated transects over Candle Lake. Flight plan similar to that flown during RF13 (01-Aug-1994).

3 August 1994 15:49:11-22:25:45
CYXE-CYXE
S 0.7':E 0.8'
Transect flight to Thompson, Manitoba, and return.
- DPB failed during flight

4 August 1994 15:48:27-22:26:01
CYXE-CYXE
S 1.0':E 0.9'
Transect to Thompson and return.

30 August 1994 16:57:22-20:35:20
CYXE-CYXE
N 1.3':W 0.3'
This flight was conducted in the southern research area. Vertical wind biases on the display (0.3 to 0.4 m/s) affected the intermittent sampler eddy accumulations.
- Lyman-alpha failed before the flight and was replaced.

31 August 1994 15:54:32-22:00:14
CYXE-CYXE
N 1.2':E 1.7'
RF18 was flown in the Candle Lake area (14 legs) sawtooth pattern flown twice above 0.9Z
- Forward video is noisy

2 September 1994 15:21:48-21:23:06
CYXE-CYYQ
S 0.7':W 1.9'
RF19 research flight up to Churchill, Manitoba, mostly at 300' altitude. Three lidar runs were incorporated during the transit.

3 September 1994 14:54:27-21:10:25
CYYQ-CYXE
S 0.8':W 1.4'
Return flight from Churchill, mirror image of RF19. There were clouds present north of Saskatoon.

6 September 1994 15:56:40-22:38:14
CYXE-CYXE
N 0.7':E 1.2'
Regional transect to Thompson at 300 ft. Return to Candle Lake for stack runs over the lake.

7 September 1994 16:57:20-22:26:50
CYXE-CYXE
S 2.9':W 4.1'
Candle Lake transects with sawtooths and lidar legs added.
- Data recording ended 20 minutes early due to inverter failure on data system.

9 September 1994 15:54:11-21:53:21
CYXE-CYXE
S 0.2':E 0.4'
Regional transect to Thompson at 300 ft. Linked with King Air on return for intercomparison and stacked runs over Candle Lake.

13 September 1994 15:19:41-21:21:03
CYXE-CYXE
S 0.9':W 0.6'
Regional transect to Thompson at 300 ft. Lidar run and sawtooth in northeast sector. Return to Candle Lake at 300 ft. With one set of vertical stacks over Candle Lake.

16 September 1994 15:55:45-22:35:43
CYXE-CYXE
S 0.5':E 0.1'
Transect to Thompson at 300 ft. En route soundings linked with King Air on return for intercomparison and stacked runs over Candle Lake. Sawtooth near the end along with maneuvers. at 300 ft. En route soundings linked with King Air on return for intercomparison and stacked runs over Candle Lake. Sawtooth near the end along with maneuvers.

6.2 Field Notes

See Section 6.1.

7. Data Description

7.1 Spatial Characteristics

7.1.1 Spatial Coverage

The majority of the data were collected over the BOREAS SSA and NSA.

The North American Datum of 1983 (NAD83) corner coordinates of the SSA are:

	Latitude	Longitude
Northwest	54.321° N	106.228° W
Northeast	54.225° N	104.237° W
Southwest	53.515° N	106.321° W
Southeast	53.420° N	104.368° W

The NAD83 corner coordinates of the NSA are:

	Latitude	Longitude
Northwest	56.249° N	98.825° W
Northeast	56.083° N	97.234° W
Southwest	55.542° N	99.045° W
Southeast	55.379° N	97.489° W

7.1.2 Spatial Coverage Map

Data were collected over the NSA and SSA of BOREAS, and along a transect between them.

7.1.3 Spatial Resolution

The fluxes and statistics archived here are for passes or segments of passes between predefined waypoints, as part of various flight patterns (see Section 5). The times and distances for the regular flux data varied depending on the aircraft speed and the distance between the waypoints. The shortest distance between waypoints is about 10 km. Included in these regular data are those from the grid patterns and the Candle Lake runs. The passes for the grid patterns (GS, GN) are 32 km in length. The Candle Lake (CS) runs were divided into two segments, one over the relatively homogeneous OA area surrounding the OA flux tower (east end of CL run), and the other over the area at the west end of the run dominated by black spruce. The moving window data represent 40-kilometer averages for overlapping portions of the flight passes. Each segment progresses 10 km along the flight path and overlaps the previous segment by 30 km.

7.1.4 Projection

Not applicable.

7.1.5 Grid Description

Not applicable.

7.2 Temporal Characteristics

7.2.1 Temporal Coverage

None given.

7.2.2 Temporal Coverage Map

None.

7.2.3 Temporal Resolution

Each archived data entry contains the start and end times for the pass/segment being summarized.

7.3 Data Characteristics

7.3.1 Parameter/Variable

The parameters contained in both the aircraft flux and moving window data files on the CD-ROM are:

```
          Column Name
------------------------------
SPATIAL_COVERAGE
RUN_START_DATE
RUN_START_TIME
RUN_END_DATE
RUN_END_TIME
FLUX_MISSION_DESIGNATOR
FLUX_MISSION_NUM
FLUX_PASS_NUM
FLUX_SEGMENT_NUM
START_LATITUDE
START_LONGITUDE
END_LATITUDE
END_LONGITUDE
START_BOREAS_X
START_BOREAS_Y
END_BOREAS_X
END_BOREAS_Y
HEADING
MEAN_PRESS_ALTITUDE
MEAN_RADAR_ALTITUDE
MEAN_WIND_DIR
MEAN_WIND_SPEED
MEAN_AIR_TEMP
MEAN_POTNTL_TEMP
MEAN_H2O_MIX_RATIO
MEAN_U_COMPNT_WIND_VELOC
MEAN_V_COMPNT_WIND_VELOC
MEAN_STATIC_PRESS
MEAN_SURF_RAD_TEMP
MEAN_DOWN_TOTAL_RAD
MEAN_UP_TOTAL_RAD
MEAN_DOWN_LONGWAVE_RAD
MEAN_UP_LONGWAVE_RAD
MEAN_NET_RAD
MEAN_UP_PPFD
MEAN_DOWN_PPFD
MEAN_AUX_RAD
MEAN_GREEN_INDEX
MEAN_CO2_CONC
MEAN_O3_CONC
MEAN_CH4_CONC
MEAN_SAT_SIM_CH1
MEAN_SAT_SIM_CH2
```

MEAN_SAT_SIM_CH3
MEAN_SAT_SIM_CH4
SDEV_AIR_TEMP
SDEV_POTNTL_TEMP
SDEV_H2O_MIX_RATIO
SDEV_U_COMPNT_WIND_VELOC
SDEV_V_COMPNT_WIND_VELOC
SDEV_STATIC_PRESS
SDEV_SURF_RAD_TEMP
SDEV_DOWN_TOTAL_RAD
SDEV_UP_TOTAL_RAD
SDEV_DOWN_LONGWAVE_RAD
SDEV_UP_LONGWAVE_RAD
SDEV_NET_RAD
SDEV_UP_PPFD
SDEV_DOWN_PPFD
SDEV_AUX_RAD
SDEV_GREEN_INDEX
SDEV_CO2_CONC
SDEV_O3_CONC
SDEV_CH4_CONC
SDEV_SAT_SIM_CH1
SDEV_SAT_SIM_CH2
SDEV_SAT_SIM_CH3
SDEV_SAT_SIM_CH4
TREND_AIR_TEMP
TREND_POTNTL_TEMP
TREND_H2O_MIX_RATIO
TREND_U_COMPNT_WIND_VELOC
TREND_V_COMPNT_WIND_VELOC
TREND_STATIC_PRESS
TREND_SURF_RAD_TEMP
TREND_DOWN_TOTAL_RAD
TREND_UP_TOTAL_RAD
TREND_DOWN_LONGWAVE_RAD
TREND_UP_LONGWAVE_RAD
TREND_GREEN_INDEX
TREND_CO2_CONC
TREND_O3_CONC
TREND_CH4_CONC
SDEV_VERT_GUST_RAW
SDEV_U_COMPNT_WIND_VELOC_RAW
SDEV_V_COMPNT_WIND_VELOC_RAW
SDEV_ALONG_WIND_RAW
SDEV_CROSS_WIND_RAW
SDEV_POTNTL_TEMP_RAW
SDEV_H2O_MIX_RATIO_RAW
SDEV_CO2_MIX_RATIO_RAW
SDEV_O3_CONC_RAW
SDEV_CH4_CONC_RAW
SKEW_VERT_GUST_RAW
SKEW_U_COMPNT_WIND_VELOC_RAW
SKEW_V_COMPNT_WIND_VELOC_RAW
SKEW_ALONG_WIND_RAW

SKEW_CROSS_WIND_RAW
SKEW_POTNTL_TEMP_RAW
SKEW_H2O_MIX_RATIO_RAW
SKEW_CO2_MIX_RATIO
SKEW_O3_CONC_RAW
SKEW_CH4_CONC_RAW
KURT_VERT_GUST_RAW
KURT_U_COMPNT_WIND_VELOC_RAW
KURT_V_COMPNT_WIND_VELOC_RAW
KURT_ALONG_WIND_RAW
KURT_CROSS_WIND_RAW
KURT_POTNTL_TEMP_RAW
KURT_H2O_MIX_RATIO_RAW
KURT_CO2_MIX_RATIO_RAW
KURT_O3_CONC_RAW
KURT_CH4_CONC_RAW
CORC_VERT_U_WIND_COMPNT_RAW
CORC_VERT_V_WIND_COMPNT_RAW
CORC_VERT_ALONG_WIND_RAW
CORC_VERT_CROSS_WIND_RAW
CORC_VERT_POTNTL_TEMP_RAW
CORC_VERT_H2O_MIX_RATIO_RAW
CORC_VERT_CO2_MIX_RATIO_RAW
CORC_VERT_O3_CONC_RAW
CORC_VERT_CH4_CONC_RAW
CORC_POTNTL_H2O_MIX_RATIO_RAW
MMNTM_FLUX_V_WIND_COMPNT_RAW
MMNTM_FLUX_U_WIND_COMPNT_RAW
MMNTM_FLUX_ALONG_MEAN_WIND_RAW
MMNTM_FLUX_CROSS_MEAN_WIND_RAW
SENSIBLE_HEAT_FLUX_RAW
LATENT_HEAT_FLUX_RAW
CO2_FLUX_RAW
O3_FLUX_RAW
O3_DEPOSITION_VELOC_RAW
CH4_FLUX_RAW
AIR_DENSITY_CONSTANT
SPECIFIC_HEAT_CONSTANT
LATENT_HEAT_VAP_CONSTANT
DRY_AIR_GAS_CONSTANT
SDEV_VERT_GUST_DET
SDEV_U_COMPNT_WIND_VELOC_DET
SDEV_V_COMPNT_WIND_VELOC_DET
SDEV_ALONG_WIND_DET
SDEV_CROSS_WIND_DET
SDEV_POTNTL_TEMP_DET
SDEV_H2O_MIX_RATIO_DET
SDEV_CO2_MIX_RATIO
SDEV_O3_CONC_DET
SDEV_CH4_CONC_DET
SKEW_VERT_GUST_DET
SKEW_U_COMPNT_WIND_VELOC_DET
SKEW_V_COMPNT_WIND_VELOC_DET
SKEW_ALONG_WIND_DET

SKEW_CROSS_WIND_DET
SKEW_POTNTL_TEMP_DET
SKEW_H2O_MIX_RATIO_DET
SKEW_CO2_MIX_RATIO_DET
SKEW_O3_CONC_DET
SKEW_CH4_CONC_DET
KURT_VERT_GUST_DET
KURT_U_COMPNT_WIND_VELOC_DET
KURT_V_COMPNT_WIND_VELOC_DET
KURT_ALONG_WIND_DET
KURT_CROSS_WIND_DET
KURT_POTNTL_TEMP_DET
KURT_H2O_MIX_RATIO_DET
KURT_CO2_MIX_RATIO_DET
KURT_O3_CONC_DET
KURT_CH4_CONC_DET
CORC_VERT_U_WIND_COMPNT_DET
CORC_VERT_V_WIND_COMPNT_DET
CORC_VERT_ALONG_WIND_DET
CORC_VERT_CROSS_WIND_DET
CORC_VERT_POTNTL_TEMP_DET
CORC_VERT_H2O_MIX_RATIO_DET
CORC_VERT_CO2_MIX_RATIO_DET
CORC_VERT_O3_CONC_DET
CORC_VERT_CH4_CONC_DET
CORC_POTNTL_H2O_MIX_RATIO_DET
MMNTM_FLUX_U_WIND_COMPNT_DET
MMNTM_FLUX_V_WIND_COMPNT_DET
MMNTM_FLUX_ALONG_MEAN_WIND_DET
MMNTM_FLUX_CROSS_MEAN_WIND_DET
SENSIBLE_HEAT_FLUX_DET
LATENT_HEAT_FLUX_DET
CO2_FLUX_DET
O3_FLUX_DET
O3_DEPOSITION_VELOC_DET
CH4_FLUX_DET
CRTFCN_CODE
REVISION_DATE

7.3.2 Variable Description/Definition

The descriptions of the parameters contained in both the aircraft flux and moving window data files on the CD-ROM are:

Column Name	Description
SPATIAL_COVERAGE	The general term used to denote the spatial area over which the data were collected.
RUN_START_DATE	The date in GMT at the beginning of the segment (or pass if not segmented) in the form DD-MON-YY.
RUN_START_TIME	The time in GMT at the beginning of the segment (or pass if not segmented).
RUN_END_DATE	The date in GMT at the end of the segment (or pass if not segmented) in the form DD-MON-YY.
RUN_END_TIME	The time in GMT at the end of the segment (or pass if not segmented).
FLUX_MISSION_DESIGNATOR	The two-letter mission identifier used to identify the type of mission being flown, where GS or GN=grids and stacks, CS=Candle Lake runs, TS or TN=site-specific runs, RT=transects, LS or LN=mini- or meso-transects, PS or PN=Budget Box pattern, HS or HN=stacks and tees, FS or FN=flights of two for intercomparison, ZS=low-level routes, and XX=not standard.
FLUX_MISSION_NUM	The sequential number for all missions flown on a given day starting at 1.
FLUX_PASS_NUM	The sequential pass number within a mission starting at 1.
FLUX_SEGMENT_NUM	The segment number within the current pass starting at 1 or given as 0 if pass is not segmented.
START_LATITUDE	The NAD83 based latitude coordinate at the start of the measurement set.
START_LONGITUDE	The NAD83 based longitude coordinate at the start of the measurement set.
END_LATITUDE	The NAD83 based latitude coordinate at the end of the measurement set.
END_LONGITUDE	The NAD83 based longitude coordinate at the end of the measurement set.
START_BOREAS_X	The x component of the BOREAS grid coordinate at the start of the measurement set.
START_BOREAS_Y	The y component of the BOREAS grid coordinate at the start of the measurement set.
END_BOREAS_X	The x component of the BOREAS grid coordinate at the end of the measurement set.
END_BOREAS_Y	The y component of the BOREAS grid coordinate at the end of the measurement set.
HEADING	The aircraft heading.
MEAN_PRESS_ALTITUDE	The mean pressure altitude.
MEAN_RADAR_ALTITUDE	The mean radar altitude.
MEAN_WIND_DIR	The mean direction from which the wind was traveling, increasing in a clockwise direction from north for the given time over the period

	defined by the start and end dates.
MEAN_WIND_SPEED	The mean wind speed for the given time over the period defined by the start and end dates.
MEAN_AIR_TEMP	The mean air temperature.
MEAN_POTNTL_TEMP	The mean potential temperature.
MEAN_H2O_MIX_RATIO	The mean water vapor mixing ratio.
MEAN_U_COMPNT_WIND_VELOC	The mean westerly vector component of the wind speed and wind direction.
MEAN_V_COMPNT_WIND_VELOC	The mean southerly vector component of the wind speed and wind direction.
MEAN_STATIC_PRESS	The mean static pressure.
MEAN_SURF_RAD_TEMP	The mean surface radiative temperature.
MEAN_DOWN_TOTAL_RAD	The mean downwelling total radiation.
MEAN_UP_TOTAL_RAD	The mean upwelling total radiation.
MEAN_DOWN_LONGWAVE_RAD	The mean downward longwave radiation.
MEAN_UP_LONGWAVE_RAD	The mean upwelling longwave radiation.
MEAN_NET_RAD	The mean net radiation.
MEAN_UP_PPFD	The mean upward photosynthetic photon flux density.
MEAN_DOWN_PPFD	The mean downward photosynthetic photon flux density.
MEAN_AUX_RAD	The mean measurement from the auxiliary radiation sensor.
MEAN_GREEN_INDEX	The mean greenness index.
MEAN_CO2_CONC	The mean carbon dioxide concentration.
MEAN_O3_CONC	The mean ozone concentration.
MEAN_CH4_CONC	The mean methane concentration.
MEAN_SAT_SIM_CH1	The mean channel 1 satellite simulator.
MEAN_SAT_SIM_CH2	The mean channel 2 satellite simulator.
MEAN_SAT_SIM_CH3	The mean channel 3 satellite simulator.
MEAN_SAT_SIM_CH4	The mean channel 4 satellite simulator.
SDEV_AIR_TEMP	The standard deviation of the air temperature.
SDEV_POTNTL_TEMP	The standard deviation of potential temperature.
SDEV_H2O_MIX_RATIO	The standard deviation of the water vapor mixing ratio.
SDEV_U_COMPNT_WIND_VELOC	The standard deviation of the westerly vector component of the wind speed and wind direction.
SDEV_V_COMPNT_WIND_VELOC	The standard deviation of the southerly vector component of the wind speed and wind direction.
SDEV_STATIC_PRESS	The standard deviation of the static pressure.
SDEV_SURF_RAD_TEMP	The standard deviation of the surface radiative temperature.
SDEV_DOWN_TOTAL_RAD	The standard deviation of downwelling total radiation.
SDEV_UP_TOTAL_RAD	The standard deviation of upwelling total radiation.
SDEV_DOWN_LONGWAVE_RAD	The standard deviation of the downward longwave radiation.
SDEV_UP_LONGWAVE_RAD	The standard deviation of upwelling longwave radiation.
SDEV_NET_RAD	The standard deviation of the mean net radiation.
SDEV_UP_PPFD	The standard deviation of the upward photosynthetic photon flux density.
SDEV_DOWN_PPFD	The standard deviation of the downward

	photosynthetic photon flux density.
SDEV_AUX_RAD	The standard deviation of the measurements from the auxiliary radiation sensor.
SDEV_GREEN_INDEX	The standard deviation of greenness index.
SDEV_CO2_CONC	The standard deviation of the CO2 concentration.
SDEV_O3_CONC	The standard deviation of the ozone concentration.
SDEV_CH4_CONC	The standard deviation of CH4 concentration.
SDEV_SAT_SIM_CH1	The standard deviation of the channel 1 satellite simulator values.
SDEV_SAT_SIM_CH2	The standard deviation of channel 2 satellite simulator values.
SDEV_SAT_SIM_CH3	The standard deviation of channel 3 satellite simulator values.
SDEV_SAT_SIM_CH4	The standard deviation of channel 4 satellite simulator values.
TREND_AIR_TEMP	The trend in air temperature.
TREND_POTNTL_TEMP	The trend in potential temperature.
TREND_H2O_MIX_RATIO	The trend in water vapor mixing ratio.
TREND_U_COMPNT_WIND_VELOC	The trend in the westerly vector component of the wind speed and wind direction.
TREND_V_COMPNT_WIND_VELOC	The trend in the southerly vector component of the wind speed and wind direction.
TREND_STATIC_PRESS	The trend in static pressure.
TREND_SURF_RAD_TEMP	The trend in surface radiative temperature.
TREND_DOWN_TOTAL_RAD	The trend in the downwelling total radiation.
TREND_UP_TOTAL_RAD	The trend in the upwelling total radiation.
TREND_DOWN_LONGWAVE_RAD	The trend in the downwelling longwave radiation.
TREND_UP_LONGWAVE_RAD	The trend in the upwelling longwave radiation.
TREND_GREEN_INDEX	The trend in the greenness index.
TREND_CO2_CONC	The trend in the carbon dioxide concentration.
TREND_O3_CONC	The trend in the ozone concentration.
TREND_CH4_CONC	The trend in the methane concentration.
SDEV_VERT_GUST_RAW	The standard deviation of the raw vertical gust.
SDEV_U_COMPNT_WIND_VELOC_RAW	The standard deviation of the raw westerly wind component.
SDEV_V_COMPNT_WIND_VELOC_RAW	The standard deviation of the raw southerly wind component.
SDEV_ALONG_WIND_RAW	The standard deviation of the raw along wind component.
SDEV_CROSS_WIND_RAW	The standard deviation of the raw cross wind component.
SDEV_POTNTL_TEMP_RAW	The standard deviation of the raw potential temperature.
SDEV_H2O_MIX_RATIO_RAW	The standard deviation of the raw water vapor mixing ratio.
SDEV_CO2_MIX_RATIO_RAW	The standard deviation of the raw carbon dioxide mixing ratio.
SDEV_O3_CONC_RAW	The standard deviation of the raw ozone concentration.
SDEV_CH4_CONC_RAW	The standard deviation of the raw methane concentration.
SKEW_VERT_GUST_RAW	The skewness of the raw vertical gust.
SKEW_U_COMPNT_WIND_VELOC_RAW	The skewness of the raw westerly wind component.

SKEW_V_COMPNT_WIND_VELOC_RAW	The skewness of the raw southerly wind component.
SKEW_ALONG_WIND_RAW	The skewness of the raw along wind component.
SKEW_CROSS_WIND_RAW	The skewness of the raw cross wind component.
SKEW_POTNTL_TEMP_RAW	The skewness of the raw potential temperature.
SKEW_H2O_MIX_RATIO_RAW	The skewness of the raw water vapor mixing ratio.
SKEW_CO2_MIX_RATIO	The skewness of the raw carbon dioxide mixing ratio.
SKEW_O3_CONC_RAW	The skewness of the raw ozone concentration.
SKEW_CH4_CONC_RAW	The skewness of the raw methane concentration.
KURT_VERT_GUST_RAW	The kurtosis of the raw vertical gust.
KURT_U_COMPNT_WIND_VELOC_RAW	The kurtosis of the raw westerly wind component.
KURT_V_COMPNT_WIND_VELOC_RAW	The kurtosis of the raw southerly wind component.
KURT_ALONG_WIND_RAW	The kurtosis of the raw along wind component.
KURT_CROSS_WIND_RAW	The kurtosis of the raw cross wind component.
KURT_POTNTL_TEMP_RAW	The kurtosis of the raw potential temperature.
KURT_H2O_MIX_RATIO_RAW	The kurtosis of the raw water vapor mixing ratio.
KURT_CO2_MIX_RATIO_RAW	The kurtosis of the raw carbon dioxide mixing ratio.
KURT_O3_CONC_RAW	The kurtosis of the raw ozone concentration.
KURT_CH4_CONC_RAW	The kurtosis of the raw methane concentration.
CORC_VERT_U_WIND_COMPNT_RAW	The correlation coefficient of the raw vertical gust/westerly wind component pair.
CORC_VERT_V_WIND_COMPNT_RAW	The correlation coefficient of the raw vertical gust/southerly wind component pair.
CORC_VERT_ALONG_WIND_RAW	The correlation coefficient of the raw vertical gust/along wind component pair.
CORC_VERT_CROSS_WIND_RAW	The correlation coefficient of the raw vertical gust/cross wind component pair.
CORC_VERT_POTNTL_TEMP_RAW	The correlation coefficient of the raw vertical gust/potential temperature pair.
CORC_VERT_H2O_MIX_RATIO_RAW	The correlation coefficient of the raw vertical gust/water vapor mixing ratio pair.
CORC_VERT_CO2_MIX_RATIO_RAW	The correlation coefficient of the raw vertical gust/carbon dioxide mixing ratio pair.
CORC_VERT_O3_CONC_RAW	The correlation coefficient of the raw vertical gust/ozone concentration pair.
CORC_VERT_CH4_CONC_RAW	The correlation coefficient of the vertical gust /methane concentration pair.
CORC_POTNTL_H2O_MIX_RATIO_RAW	The correlation coefficient of the raw potential temperature/water vapor mixing ratio pair.
MMNTM_FLUX_V_WIND_COMPNT_RAW	The momentum flux using the raw southerly wind component.
MMNTM_FLUX_U_WIND_COMPNT_RAW	The momentum flux using the raw westerly wind component.
MMNTM_FLUX_ALONG_MEAN_WIND_RAW	The momentum flux using the raw along mean wind component.
MMNTM_FLUX_CROSS_MEAN_WIND_RAW	The momentum flux using the raw across mean wind component.
SENSIBLE_HEAT_FLUX_RAW	The raw sensible heat flux.
LATENT_HEAT_FLUX_RAW	The raw latent heat flux.
CO2_FLUX_RAW	The raw carbon dioxide flux.
O3_FLUX_RAW	The raw ozone flux.
O3_DEPOSITION_VELOC_RAW	The raw ozone deposition velocity.
CH4_FLUX_RAW	The raw methane flux.

AIR_DENSITY_CONSTANT	The constant used for air density in the flux calculations.
SPECIFIC_HEAT_CONSTANT	The constant used for specific heat at constant pressure in the flux calculations.
LATENT_HEAT_VAP_CONSTANT	The constant used for latent heat of vaporization in the flux calculations.
DRY_AIR_GAS_CONSTANT	The dry air gas constant used in the flux calculations.
SDEV_VERT_GUST_DET	The standard deviation of the detrended vertical gust.
SDEV_U_COMPNT_WIND_VELOC_DET	The standard deviation of the detrended westerly wind component.
SDEV_V_COMPNT_WIND_VELOC_DET	The standard deviation of the detrended southerly wind component.
SDEV_ALONG_WIND_DET	The standard deviation of the detrended along wind component.
SDEV_CROSS_WIND_DET	The standard deviation of the detrended cross wind component.
SDEV_POTNTL_TEMP_DET	The standard deviation of the detrended potential temperature.
SDEV_H2O_MIX_RATIO_DET	The standard deviation of the detrended water vapor mixing ratio.
SDEV_CO2_MIX_RATIO	The standard deviation of the detrended carbon dioxide mixing ratio.
SDEV_O3_CONC_DET	The standard deviation of the detrended ozone concentration.
SDEV_CH4_CONC_DET	The standard deviation of the detrended methane concentration.
SKEW_VERT_GUST_DET	The skewness of the detrended vertical gust.
SKEW_U_COMPNT_WIND_VELOC_DET	The skewness of the detrended westerly wind comp component.
SKEW_V_COMPNT_WIND_VELOC_DET	The skewness of the detrended southerly wind component.
SKEW_ALONG_WIND_DET	The skewness of the detrended along wind component.
SKEW_CROSS_WIND_DET	The skewness of the detrended cross wind component.
SKEW_POTNTL_TEMP_DET	The skewness of the detrended potential temperature.
SKEW_H2O_MIX_RATIO_DET	The skewness of the detrended water vapor mixing ratio.
SKEW_CO2_MIX_RATIO_DET	The skewness of the detrended carbon dioxide mixing ratio.
SKEW_O3_CONC_DET	The skewness of the detrended ozone concentration.
SKEW_CH4_CONC_DET	The skewness of the detrended methane concentration.
KURT_VERT_GUST_DET	The kurtosis of the detrended vertical gust.
KURT_U_COMPNT_WIND_VELOC_DET	The kurtosis of the detrended westerly wind component.
KURT_V_COMPNT_WIND_VELOC_DET	The kurtosis of the detrended southerly wind component.
KURT_ALONG_WIND_DET	The kurtosis of the detrended along wind component.

KURT_CROSS_WIND_DET	The kurtosis of the detrended cross wind component.
KURT_POTNTL_TEMP_DET	The kurtosis of the detrended potential temperature.
KURT_H2O_MIX_RATIO_DET	The kurtosis of the detrended water vapor mixing ratio.
KURT_CO2_MIX_RATIO_DET	The kurtosis of the detrended carbon dioxide mixing ratio.
KURT_O3_CONC_DET	The kurtosis of the detrended ozone concentration.
KURT_CH4_CONC_DET	The kurtosis of the detrended methane concentration.
CORC_VERT_U_WIND_COMPNT_DET	The correlation coefficient of the detrended vertical gust/westerly wind component pair.
CORC_VERT_V_WIND_COMPNT_DET	The correlation coefficient of the detrended vertical gust/southerly wind component pair.
CORC_VERT_ALONG_WIND_DET	The correlation coefficient of the detrended vertical gust/along wind component pair.
CORC_VERT_CROSS_WIND_DET	The correlation coefficient of the detrended vertical gust/cross wind component pair.
CORC_VERT_POTNTL_TEMP_DET	The correlation coefficient of the detrended vertical gust/potential temperature pair.
CORC_VERT_H2O_MIX_RATIO_DET	The correlation coefficient of the detrended vertical gust/water vapor mixing ratio pair.
CORC_VERT_CO2_MIX_RATIO_DET	The correlation coefficient of the detrended vertical gust/carbon dioxide mixing ratio pair.
CORC_VERT_O3_CONC_DET	The correlation coefficient of the detrended vertical gust/ozone concentration pair.
CORC_VERT_CH4_CONC_DET	The correlation coefficient of the detrended vertical gust/methane concentration pair.
CORC_POTNTL_H2O_MIX_RATIO_DET	The correlation coefficient of the detrended potential temperature/water vapor mixing ratio pair.
MMNTM_FLUX_U_WIND_COMPNT_DET	The momentum flux using the detrended westerly wind component.
MMNTM_FLUX_V_WIND_COMPNT_DET	The momentum flux using the detrended southerly wind component.
MMNTM_FLUX_ALONG_MEAN_WIND_DET	The momentum flux using the detrended along mean wind component.
MMNTM_FLUX_CROSS_MEAN_WIND_DET	The momentum flux using the detrended across mean wind component.
SENSIBLE_HEAT_FLUX_DET	The detrended sensible heat flux.
LATENT_HEAT_FLUX_DET	The detrended latent heat flux.
CO2_FLUX_DET	The detrended carbon dioxide flux.
O3_FLUX_DET	The detrended ozone flux.
O3_DEPOSITION_VELOC_DET	The detrended ozone deposition velocity.
CH4_FLUX_DET	The detrended methane flux.
CRTFCN_CODE	The BOREAS certification level of the data. Examples are CPI (Checked by PI), CGR (Certified by Group), PRE (Preliminary), and CPI-??? (CPI but questionable).
REVISION_DATE	The most recent date when the information in the referenced data base table record was revised.

7.3.3 Unit of Measurement

The measurement units for the parameters contained in both the aircraft flux and moving window data files on the CD-ROM are:

Column Name	Units
SPATIAL_COVERAGE	[none]
RUN_START_DATE	[DD-MON-YY]
RUN_START_TIME	[HHMMSS GMT]
RUN_END_DATE	[DD-MON-YY]
RUN_END_TIME	[HHMMSS GMT]
FLUX_MISSION_DESIGNATOR	[none]
FLUX_MISSION_NUM	[unitless]
FLUX_PASS_NUM	[unitless]
FLUX_SEGMENT_NUM	[unitless]
START_LATITUDE	[degrees]
START_LONGITUDE	[degrees]
END_LATITUDE	[degrees]
END_LONGITUDE	[degrees]
START_BOREAS_X	[kilometers]
START_BOREAS_Y	[kilometers]
END_BOREAS_X	[kilometers]
END_BOREAS_Y	[kilometers]
HEADING	[degrees]
MEAN_PRESS_ALTITUDE	[meters]
MEAN_RADAR_ALTITUDE	[meters]
MEAN_WIND_DIR	[degrees]
MEAN_WIND_SPEED	[meters][second^-1]
MEAN_AIR_TEMP	[degrees Celsius]
MEAN_POTNTL_TEMP	[degrees Kelvin]
MEAN_H2O_MIX_RATIO	[grams of water vapor][kilogram dry air^-1]
MEAN_U_COMPNT_WIND_VELOC	[meters][second^-1]
MEAN_V_COMPNT_WIND_VELOC	[meters][second^-1]
MEAN_STATIC_PRESS	[kiloPascals]
MEAN_SURF_RAD_TEMP	[degrees Celsius]
MEAN_DOWN_TOTAL_RAD	[Watts][meter^-2]
MEAN_UP_TOTAL_RAD	[Watts][meter^-2]
MEAN_DOWN_LONGWAVE_RAD	[Watts][meter^-2]
MEAN_UP_LONGWAVE_RAD	[Watts][meter^-2]
MEAN_NET_RAD	[Watts][meter^-2]
MEAN_UP_PPFD	[microEinsteins][meter^-2][second^-1]
MEAN_DOWN_PPFD	[microEinsteins][meter^-2][second^-1]
MEAN_AUX_RAD	[Watts][meter^-2]
MEAN_GREEN_INDEX	[unitless]
MEAN_CO2_CONC	[micromoles CO2][mole air^-1]
MEAN_O3_CONC	[nanomoles O3][mole air^-1]
MEAN_CH4_CONC	[nanomoles CH4][mole air^-1]
MEAN_SAT_SIM_CH1	[unitless]
MEAN_SAT_SIM_CH2	[unitless]
MEAN_SAT_SIM_CH3	[unitless]
MEAN_SAT_SIM_CH4	[unitless]
SDEV_AIR_TEMP	[degrees Celsius]
SDEV_POTNTL_TEMP	[degrees Kelvin]
SDEV_H2O_MIX_RATIO	[grams of water vapor][kilogram dry air^-1]

SDEV_U_COMPNT_WIND_VELOC	[meters][second^-1]
SDEV_V_COMPNT_WIND_VELOC	[meters][second^-1]
SDEV_STATIC_PRESS	[kiloPascals]
SDEV_SURF_RAD_TEMP	[degrees Celsius]
SDEV_DOWN_TOTAL_RAD	[Watts][meter^-2]
SDEV_UP_TOTAL_RAD	[Watts][meter^-2]
SDEV_DOWN_LONGWAVE_RAD	[Watts][meter^-2]
SDEV_UP_LONGWAVE_RAD	[Watts][meter^-2]
SDEV_NET_RAD	[Watts][meter^-2]
SDEV_UP_PPFD	[microEinsteins][meter^-2][second^-1]
SDEV_DOWN_PPFD	[microEinsteins][meter^-2][second^-1]
SDEV_AUX_RAD	[unitless]
SDEV_GREEN_INDEX	[unitless]
SDEV_CO2_CONC	[micromoles CO2][mole air^-1]
SDEV_O3_CONC	[nanomoles O3][mole air^-1]
SDEV_CH4_CONC	[nanomoles CH4][mole air^-1]
SDEV_SAT_SIM_CH1	[unitless]
SDEV_SAT_SIM_CH2	[unitless]
SDEV_SAT_SIM_CH3	[unitless]
SDEV_SAT_SIM_CH4	[unitless]
TREND_AIR_TEMP	[degrees Celsius][meter^-1]
TREND_POTNTL_TEMP	[degrees Kelvin][meter^-1]
TREND_H2O_MIX_RATIO	[grams of water vapor][kilogram dry air^-1] [meter^-1]
TREND_U_COMPNT_WIND_VELOC	[second^-1]
TREND_V_COMPNT_WIND_VELOC	[second^-1]
TREND_STATIC_PRESS	[kiloPascals][meter^-1]
TREND_SURF_RAD_TEMP	[degrees Celsius][meter^-1]
TREND_DOWN_TOTAL_RAD	[Watts][meter^-3]
TREND_UP_TOTAL_RAD	[Watts][meter^-3]
TREND_DOWN_LONGWAVE_RAD	[Watts][meter^-3]
TREND_UP_LONGWAVE_RAD	[Watts][meter^-3]
TREND_GREEN_INDEX	[meter^-1]
TREND_CO2_CONC	[micromoles CO2][mole air^-1][meter^-1]
TREND_O3_CONC	[nanomoles O3][mole air^-1][meter^-1]
TREND_CH4_CONC	[nanomoles CH4][mole air^-1][meter^-1]
SDEV_VERT_GUST_RAW	[meters][second^-1]
SDEV_U_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
SDEV_V_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
SDEV_ALONG_WIND_RAW	[meters][second^-1]
SDEV_CROSS_WIND_RAW	[meters][second^-1]
SDEV_POTNTL_TEMP_RAW	[degrees Kelvin]
SDEV_H2O_MIX_RATIO_RAW	[grams of water vapor][kilogram dry air^-1]
SDEV_CO2_MIX_RATIO_RAW	[unitless]
SDEV_O3_CONC_RAW	[nanomoles O3][mole air^-1]
SDEV_CH4_CONC_RAW	[nanomoles CH4][mole air^-1]
SKEW_VERT_GUST_RAW	[meters][second^-1]
SKEW_U_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
SKEW_V_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
SKEW_ALONG_WIND_RAW	[meters][second^-1]
SKEW_CROSS_WIND_RAW	[meters][second^-1]
SKEW_POTNTL_TEMP_RAW	[degrees Kelvin]
SKEW_H2O_MIX_RATIO_RAW	[grams of water vapor][kilogram dry air^-1]
SKEW_CO2_MIX_RATIO	[unitless]

SKEW_O3_CONC_RAW	[nanomoles O3][mole air^-1]
SKEW_CH4_CONC_RAW	[nanomoles CH4][mole air^-1]
KURT_VERT_GUST_RAW	[meters][second^-1]
KURT_U_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
KURT_V_COMPNT_WIND_VELOC_RAW	[meters][second^-1]
KURT_ALONG_WIND_RAW	[meters][second^-1]
KURT_CROSS_WIND_RAW	[meters][second^-1]
KURT_POTNTL_TEMP_RAW	[degrees Kelvin]
KURT_H2O_MIX_RATIO_RAW	[grams of water vapor][kilogram dry air^-1]
KURT_CO2_MIX_RATIO_RAW	[unitless]
KURT_O3_CONC_RAW	[nanomoles O3][mole air^-1]
KURT_CH4_CONC_RAW	[nanomoles CH4][mole air^-1]
CORC_VERT_U_WIND_COMPNT_RAW	[meters^2][second^-2]
CORC_VERT_V_WIND_COMPNT_RAW	[meters^2][second^-2]
CORC_VERT_ALONG_WIND_RAW	[meters^2][second^-2]
CORC_VERT_CROSS_WIND_RAW	[meters^2][second^-2]
CORC_VERT_POTNTL_TEMP_RAW	[degrees Kelvin][meters][second^-1]
CORC_VERT_H2O_MIX_RATIO_RAW	[grams of water vapor][meters] [kilogram dry air^-1][second^-1]
CORC_VERT_CO2_MIX_RATIO_RAW	[unitless]
CORC_VERT_O3_CONC_RAW	[nanomoles O3][meters][mole air^-1][second^-1]
CORC_VERT_CH4_CONC_RAW	[nanomoles CH4][meters][mole air^-1][second^-1]
CORC_POTNTL_H2O_MIX_RATIO_RAW	[grams of water vapor][degrees Kelvin] [kilogram dry air^-1]
MMNTM_FLUX_V_WIND_COMPNT_RAW	[Newtons][meter^-2]
MMNTM_FLUX_U_WIND_COMPNT_RAW	[Newtons][meter^-2]
MMNTM_FLUX_ALONG_MEAN_WIND_RAW	[Newtons][meter^-2]
MMNTM_FLUX_CROSS_MEAN_WIND_RAW	[Newtons][meter^-2]
SENSIBLE_HEAT_FLUX_RAW	[Watts][meter^-2]
LATENT_HEAT_FLUX_RAW	[Watts][meter^-2]
CO2_FLUX_RAW	[micromoles CO2][meter^-2][second^-1]
O3_FLUX_RAW	[nanomoles O3][meter^-2][second^-1]
O3_DEPOSITION_VELOC_RAW	[millimeters][second^-1]
CH4_FLUX_RAW	[nanomoles CH4][meter^-2][second^-1]
AIR_DENSITY_CONSTANT	[kilograms][meter^-3]
SPECIFIC_HEAT_CONSTANT	[Joules][kilogram^-1][degree Kelvin^-1]
LATENT_HEAT_VAP_CONSTANT	[Joules][kilogram^-1]
DRY_AIR_GAS_CONSTANT	[Joules][kilogram^-1][degree Kelvin^-1]
SDEV_VERT_GUST_DET	[meters][second^-1]
SDEV_U_COMPNT_WIND_VELOC_DET	[meters][second^-1]
SDEV_V_COMPNT_WIND_VELOC_DET	[meters][second^-1]
SDEV_ALONG_WIND_DET	[meters][second^-1]
SDEV_CROSS_WIND_DET	[meters][second^-1]
SDEV_POTNTL_TEMP_DET	[degrees Kelvin]
SDEV_H2O_MIX_RATIO_DET	[grams of water vapor][kilogram dry air^-1]
SDEV_CO2_MIX_RATIO	[unitless]
SDEV_O3_CONC_DET	[nanomoles O3][mole air^-1]
SDEV_CH4_CONC_DET	[nanomoles CH4][mole air^-1]
SKEW_VERT_GUST_DET	[meters][second^-1]
SKEW_U_COMPNT_WIND_VELOC_DET	[meters][second^-1]
SKEW_V_COMPNT_WIND_VELOC_DET	[meters][second^-1]
SKEW_ALONG_WIND_DET	[meters][second^-1]
SKEW_CROSS_WIND_DET	[meters][second^-1]
SKEW_POTNTL_TEMP_DET	[degrees Kelvin]

SKEW_H2O_MIX_RATIO_DET	[grams of water vapor][kilogram dry air^-1]
SKEW_CO2_MIX_RATIO_DET	[unitless]
SKEW_O3_CONC_DET	[nanomoles O3][mole air^-1]
SKEW_CH4_CONC_DET	[nanomoles CH4][mole air^-1]
KURT_VERT_GUST_DET	[meters][second^-1]
KURT_U_COMPNT_WIND_VELOC_DET	[meters][second^-1]
KURT_V_COMPNT_WIND_VELOC_DET	[meters][second^-1]
KURT_ALONG_WIND_DET	[meters][second^-1]
KURT_CROSS_WIND_DET	[meters][second^-1]
KURT_POTNTL_TEMP_DET	[degrees Kelvin]
KURT_H2O_MIX_RATIO_DET	[grams of water vapor][kilogram dry air^-1]
KURT_CO2_MIX_RATIO_DET	[unitless]
KURT_O3_CONC_DET	[nanomoles O3][mole air^-1]
KURT_CH4_CONC_DET	[nanomoles CH4][mole air^-1]
CORC_VERT_U_WIND_COMPNT_DET	[meters^2][second^-2]
CORC_VERT_V_WIND_COMPNT_DET	[meters^2][second^-2]
CORC_VERT_ALONG_WIND_DET	[meters^2][second^-2]
CORC_VERT_CROSS_WIND_DET	[meters^2][second^-2]
CORC_VERT_POTNTL_TEMP_DET	[degrees Kelvin][meters][second^-1]
CORC_VERT_H2O_MIX_RATIO_DET	[grams of water vapor][meters][kilogram dry air^-1][second^-1]
CORC_VERT_CO2_MIX_RATIO_DET	[unitless]
CORC_VERT_O3_CONC_DET	[nanomoles O3][meters][mole air^-1][second^-1]
CORC_VERT_CH4_CONC_DET	[nanomoles CH4][meters][mole air^-1][second^-1]
CORC_POTNTL_H2O_MIX_RATIO_DET	[grams of water vapor][degrees Kelvin][kilogram dry air^-1]
MMNTM_FLUX_U_WIND_COMPNT_DET	[Newtons][meter^-2]
MMNTM_FLUX_V_WIND_COMPNT_DET	[Newtons][meter^-2]
MMNTM_FLUX_ALONG_MEAN_WIND_DET	[Newtons][meter^-2]
MMNTM_FLUX_CROSS_MEAN_WIND_DET	[Newtons][meter^-2]
SENSIBLE_HEAT_FLUX_DET	[Watts][meter^-2]
LATENT_HEAT_FLUX_DET	[Watts][meter^-2]
CO2_FLUX_DET	[micromoles CO2][meter^-2][second^-1]
O3_FLUX_DET	[nanomoles O3][meter^-2][second^-1]
O3_DEPOSITION_VELOC_DET	[millimeters][second^-1]
CH4_FLUX_DET	[nanomoles CH4][meter^-2][second^-1]
CRTFCN_CODE	[none]
REVISION_DATE	[DD-MON-YY]

7.3.4 Data Source

The sources of the parameter values contained in both the aircraft flux and moving window data files on the CD-ROM are:

Column Name	Data Source
SPATIAL_COVERAGE	[Assigned by BORIS]
RUN_START_DATE	[Supplied by AFM-03]
RUN_START_TIME	[Supplied by AFM-03]
RUN_END_DATE	[Supplied by AFM-03]
RUN_END_TIME	[Supplied by AFM-03]
FLUX_MISSION_DESIGNATOR	[Supplied by AFM-03]
FLUX_MISSION_NUM	[Supplied by AFM-03]
FLUX_PASS_NUM	[Supplied by AFM-03]
FLUX_SEGMENT_NUM	[Supplied by AFM-03]
START_LATITUDE	[Supplied by AFM-03]
START_LONGITUDE	[Supplied by AFM-03]
END_LATITUDE	[Supplied by AFM-03]
END_LONGITUDE	[Supplied by AFM-03]
START_BOREAS_X	[Supplied by AFM-03]
START_BOREAS_Y	[Supplied by AFM-03]
END_BOREAS_X	[Supplied by AFM-03]
END_BOREAS_Y	[Supplied by AFM-03]
HEADING	[Supplied by AFM-03]
MEAN_PRESS_ALTITUDE	[Supplied by AFM-03]
MEAN_RADAR_ALTITUDE	[Supplied by AFM-03]
MEAN_WIND_DIR	[Supplied by AFM-03]
MEAN_WIND_SPEED	[Supplied by AFM-03]
MEAN_AIR_TEMP	[Supplied by AFM-03]
MEAN_POTNTL_TEMP	[Supplied by AFM-03]
MEAN_H2O_MIX_RATIO	[Supplied by AFM-03]
MEAN_U_COMPNT_WIND_VELOC	[Supplied by AFM-03]
MEAN_V_COMPNT_WIND_VELOC	[Supplied by AFM-03]
MEAN_STATIC_PRESS	[Supplied by AFM-03]
MEAN_SURF_RAD_TEMP	[Supplied by AFM-03]
MEAN_DOWN_TOTAL_RAD	[Supplied by AFM-03]
MEAN_UP_TOTAL_RAD	[Supplied by AFM-03]
MEAN_DOWN_LONGWAVE_RAD	[Supplied by AFM-03]
MEAN_UP_LONGWAVE_RAD	[Supplied by AFM-03]
MEAN_NET_RAD	[Supplied by AFM-03]
MEAN_UP_PPFD	[Supplied by AFM-03]
MEAN_DOWN_PPFD	[Supplied by AFM-03]
MEAN_AUX_RAD	[Supplied by AFM-03]
MEAN_GREEN_INDEX	[Supplied by AFM-03]
MEAN_CO2_CONC	[Supplied by AFM-03]
MEAN_O3_CONC	[Supplied by AFM-03]
MEAN_CH4_CONC	[Supplied by AFM-03]
MEAN_SAT_SIM_CH1	[Supplied by AFM-03]
MEAN_SAT_SIM_CH2	[Supplied by AFM-03]
MEAN_SAT_SIM_CH3	[Supplied by AFM-03]
MEAN_SAT_SIM_CH4	[Supplied by AFM-03]
SDEV_AIR_TEMP	[Supplied by AFM-03]
SDEV_POTNTL_TEMP	[Supplied by AFM-03]
SDEV_H2O_MIX_RATIO	[Supplied by AFM-03]

SDEV_U_COMPNT_WIND_VELOC	[Supplied by AFM-03]
SDEV_V_COMPNT_WIND_VELOC	[Supplied by AFM-03]
SDEV_STATIC_PRESS	[Supplied by AFM-03]
SDEV_SURF_RAD_TEMP	[Supplied by AFM-03]
SDEV_DOWN_TOTAL_RAD	[Supplied by AFM-03]
SDEV_UP_TOTAL_RAD	[Supplied by AFM-03]
SDEV_DOWN_LONGWAVE_RAD	[Supplied by AFM-03]
SDEV_UP_LONGWAVE_RAD	[Supplied by AFM-03]
SDEV_NET_RAD	[Supplied by AFM-03]
SDEV_UP_PPFD	[Supplied by AFM-03]
SDEV_DOWN_PPFD	[Supplied by AFM-03]
SDEV_AUX_RAD	[Supplied by AFM-03]
SDEV_GREEN_INDEX	[Supplied by AFM-03]
SDEV_CO2_CONC	[Supplied by AFM-03]
SDEV_O3_CONC	[Supplied by AFM-03]
SDEV_CH4_CONC	[Supplied by AFM-03]
SDEV_SAT_SIM_CH1	[Supplied by AFM-03]
SDEV_SAT_SIM_CH2	[Supplied by AFM-03]
SDEV_SAT_SIM_CH3	[Supplied by AFM-03]
SDEV_SAT_SIM_CH4	[Supplied by AFM-03]
TREND_AIR_TEMP	[Supplied by AFM-03]
TREND_POTNTL_TEMP	[Supplied by AFM-03]
TREND_H2O_MIX_RATIO	[Supplied by AFM-03]
TREND_U_COMPNT_WIND_VELOC	[Supplied by AFM-03]
TREND_V_COMPNT_WIND_VELOC	[Supplied by AFM-03]
TREND_STATIC_PRESS	[Supplied by AFM-03]
TREND_SURF_RAD_TEMP	[Supplied by AFM-03]
TREND_DOWN_TOTAL_RAD	[Supplied by AFM-03]
TREND_UP_TOTAL_RAD	[Supplied by AFM-03]
TREND_DOWN_LONGWAVE_RAD	[Supplied by AFM-03]
TREND_UP_LONGWAVE_RAD	[Supplied by AFM-03]
TREND_GREEN_INDEX	[Supplied by AFM-03]
TREND_CO2_CONC	[Supplied by AFM-03]
TREND_O3_CONC	[Supplied by AFM-03]
TREND_CH4_CONC	[Supplied by AFM-03]
SDEV_VERT_GUST_RAW	[Supplied by AFM-03]
SDEV_U_COMPNT_WIND_VELOC_RAW	[Supplied by AFM-03]
SDEV_V_COMPNT_WIND_VELOC_RAW	[Supplied by AFM-03]
SDEV_ALONG_WIND_RAW	[Supplied by AFM-03]
SDEV_CROSS_WIND_RAW	[Supplied by AFM-03]
SDEV_POTNTL_TEMP_RAW	[Supplied by AFM-03]
SDEV_H2O_MIX_RATIO_RAW	[Supplied by AFM-03]
SDEV_CO2_MIX_RATIO_RAW	[Supplied by AFM-03]
SDEV_O3_CONC_RAW	[Supplied by AFM-03]
SDEV_CH4_CONC_RAW	[Supplied by AFM-03]
SKEW_VERT_GUST_RAW	[Supplied by AFM-03]
SKEW_U_COMPNT_WIND_VELOC_RAW	[Supplied by AFM-03]
SKEW_V_COMPNT_WIND_VELOC_RAW	[Supplied by AFM-03]
SKEW_ALONG_WIND_RAW	[Supplied by AFM-03]
SKEW_CROSS_WIND_RAW	[Supplied by AFM-03]
SKEW_POTNTL_TEMP_RAW	[Supplied by AFM-03]
SKEW_H2O_MIX_RATIO_RAW	[Supplied by AFM-03]
SKEW_CO2_MIX_RATIO	[Supplied by AFM-03]
SKEW_O3_CONC_RAW	[Supplied by AFM-03]

SKEW_CH4_CONC_RAW [Supplied by AFM-03]
KURT_VERT_GUST_RAW [Supplied by AFM-03]
KURT_U_COMPNT_WIND_VELOC_RAW [Supplied by AFM-03]
KURT_V_COMPNT_WIND_VELOC_RAW [Supplied by AFM-03]
KURT_ALONG_WIND_RAW [Supplied by AFM-03]
KURT_CROSS_WIND_RAW [Supplied by AFM-03]
KURT_POTNTL_TEMP_RAW [Supplied by AFM-03]
KURT_H2O_MIX_RATIO_RAW [Supplied by AFM-03]
KURT_CO2_MIX_RATIO_RAW [Supplied by AFM-03]
KURT_O3_CONC_RAW [Supplied by AFM-03]
KURT_CH4_CONC_RAW [Supplied by AFM-03]
CORC_VERT_U_WIND_COMPNT_RAW [Supplied by AFM-03]
CORC_VERT_V_WIND_COMPNT_RAW [Supplied by AFM-03]
CORC_VERT_ALONG_WIND_RAW [Supplied by AFM-03]
CORC_VERT_CROSS_WIND_RAW [Supplied by AFM-03]
CORC_VERT_POTNTL_TEMP_RAW [Supplied by AFM-03]
CORC_VERT_H2O_MIX_RATIO_RAW [Supplied by AFM-03]
CORC_VERT_CO2_MIX_RATIO_RAW [Supplied by AFM-03]
CORC_VERT_O3_CONC_RAW [Supplied by AFM-03]
CORC_VERT_CH4_CONC_RAW [Supplied by AFM-03]
CORC_POTNTL_H2O_MIX_RATIO_RAW [Supplied by AFM-03]
MMNTM_FLUX_V_WIND_COMPNT_RAW [Supplied by AFM-03]
MMNTM_FLUX_U_WIND_COMPNT_RAW [Supplied by AFM-03]
MMNTM_FLUX_ALONG_MEAN_WIND_RAW [Supplied by AFM-03]
MMNTM_FLUX_CROSS_MEAN_WIND_RAW [Supplied by AFM-03]
SENSIBLE_HEAT_FLUX_RAW [Supplied by AFM-03]
LATENT_HEAT_FLUX_RAW [Supplied by AFM-03]
CO2_FLUX_RAW [Supplied by AFM-03]
O3_FLUX_RAW [Supplied by AFM-03]
O3_DEPOSITION_VELOC_RAW [Supplied by AFM-03]
CH4_FLUX_RAW [Supplied by AFM-03]
AIR_DENSITY_CONSTANT [Supplied by AFM-03]
SPECIFIC_HEAT_CONSTANT [Supplied by AFM-03]
LATENT_HEAT_VAP_CONSTANT [Supplied by AFM-03]
DRY_AIR_GAS_CONSTANT [Supplied by AFM-03]
SDEV_VERT_GUST_DET [Supplied by AFM-03]
SDEV_U_COMPNT_WIND_VELOC_DET [Supplied by AFM-03]
SDEV_V_COMPNT_WIND_VELOC_DET [Supplied by AFM-03]
SDEV_ALONG_WIND_DET [Supplied by AFM-03]
SDEV_CROSS_WIND_DET [Supplied by AFM-03]
SDEV_POTNTL_TEMP_DET [Supplied by AFM-03]
SDEV_H2O_MIX_RATIO_DET [Supplied by AFM-03]
SDEV_CO2_MIX_RATIO [Supplied by AFM-03]
SDEV_O3_CONC_DET [Supplied by AFM-03]
SDEV_CH4_CONC_DET [Supplied by AFM-03]
SKEW_VERT_GUST_DET [Supplied by AFM-03]
SKEW_U_COMPNT_WIND_VELOC_DET [Supplied by AFM-03]
SKEW_V_COMPNT_WIND_VELOC_DET [Supplied by AFM-03]
SKEW_ALONG_WIND_DET [Supplied by AFM-03]
SKEW_CROSS_WIND_DET [Supplied by AFM-03]
SKEW_POTNTL_TEMP_DET [Supplied by AFM-03]
SKEW_H2O_MIX_RATIO_DET [Supplied by AFM-03]
SKEW_CO2_MIX_RATIO_DET [Supplied by AFM-03]
SKEW_O3_CONC_DET [Supplied by AFM-03]

```
SKEW_CH4_CONC_DET                [Supplied by AFM-03]
KURT_VERT_GUST_DET               [Supplied by AFM-03]
KURT_U_COMPNT_WIND_VELOC_DET     [Supplied by AFM-03]
KURT_V_COMPNT_WIND_VELOC_DET     [Supplied by AFM-03]
KURT_ALONG_WIND_DET              [Supplied by AFM-03]
KURT_CROSS_WIND_DET              [Supplied by AFM-03]
KURT_POTNTL_TEMP_DET             [Supplied by AFM-03]
KURT_H2O_MIX_RATIO_DET           [Supplied by AFM-03]
KURT_CO2_MIX_RATIO_DET           [Supplied by AFM-03]
KURT_O3_CONC_DET                 [Supplied by AFM-03]
KURT_CH4_CONC_DET                [Supplied by AFM-03]
CORC_VERT_U_WIND_COMPNT_DET      [Supplied by AFM-03]
CORC_VERT_V_WIND_COMPNT_DET      [Supplied by AFM-03]
CORC_VERT_ALONG_WIND_DET         [Supplied by AFM-03]
CORC_VERT_CROSS_WIND_DET         [Supplied by AFM-03]
CORC_VERT_POTNTL_TEMP_DET        [Supplied by AFM-03]
CORC_VERT_H2O_MIX_RATIO_DET      [Supplied by AFM-03]
CORC_VERT_CO2_MIX_RATIO_DET      [Supplied by AFM-03]
CORC_VERT_O3_CONC_DET            [Supplied by AFM-03]
CORC_VERT_CH4_CONC_DET           [Supplied by AFM-03]
CORC_POTNTL_H2O_MIX_RATIO_DET    [Supplied by AFM-03]
MMNTM_FLUX_U_WIND_COMPNT_DET     [Supplied by AFM-03]
MMNTM_FLUX_V_WIND_COMPNT_DET     [Supplied by AFM-03]
MMNTM_FLUX_ALONG_MEAN_WIND_DET   [Supplied by AFM-03]
MMNTM_FLUX_CROSS_MEAN_WIND_DET   [Supplied by AFM-03]
SENSIBLE_HEAT_FLUX_DET           [Supplied by AFM-03]
LATENT_HEAT_FLUX_DET             [Supplied by AFM-03]
CO2_FLUX_DET                     [Supplied by AFM-03]
O3_FLUX_DET                      [Supplied by AFM-03]
O3_DEPOSITION_VELOC_DET          [Supplied by AFM-03]
CH4_FLUX_DET                     [Supplied by AFM-03]
CRTFCN_CODE                      [Assigned by BORIS]
REVISION_DATE                    [Assigned by BORIS]
```

7.3.5 Data Range

The following table gives information about the parameter values found in the aircraft flux data files on the CD-ROM.

Column Name	Minimum Data Value	Maximum Data Value	Missng Data Value	Unrel Data Value	Below Detect Limit	Data Not Cllctd
SPATIAL_COVERAGE	N/A	N/A	None	None	None	None
RUN_START_DATE	25-MAY-94	16-SEP-94	None	None	None	None
RUN_START_TIME	145611	222903	None	None	None	None
RUN_END_DATE	25-MAY-94	16-SEP-94	None	None	None	None
RUN_END_TIME	150400	223746	None	None	None	None
FLUX_MISSION_ DESIGNATOR	CS	RT	None	None	None	None
FLUX_MISSION_NUM	1	1	None	None	None	None
FLUX_PASS_NUM	1	21	None	None	None	None
FLUX_SEGMENT_NUM	0	0	None	None	None	None
START_LATITUDE	52.3929	60.5322	None	None	None	None
START_LONGITUDE	-107.051	-94.1105	None	None	None	None

END_LATITUDE	52.5237	60.5222	None	None	None	None
END_LONGITUDE	-107.061	-94.0708	None	None	None	None
START_BOREAS_X	262.34	966.7	None	None	None	None
START_BOREAS_Y	164.51	1154.64	None	None	None	None
END_BOREAS_X	261.63	972.2	None	None	None	None
END_BOREAS_Y	178.96	1155.33	None	None	None	None
HEADING	4.6	358.6	None	None	None	None
MEAN_PRESS_ALTITUDE	27.8	4848.7	None	None	None	None
MEAN_RADAR_ALTITUDE	36.4	4728.7	None	None	None	None
MEAN_WIND_DIR	.5	359.9	None	None	None	None
MEAN_WIND_SPEED	.15	21	None	None	None	None
MEAN_AIR_TEMP	-11.58	28.51	None	None	None	None
MEAN_POTNTL_TEMP	283.22	313.5	None	None	None	None
MEAN_H2O_MIX_RATIO	-.38	14.25	None	None	None	None
MEAN_U_COMPNT_WIND_VELOC	-10.03	17.22	None	None	None	None
MEAN_V_COMPNT_WIND_VELOC	-14.42	16.96	None	None	None	None
MEAN_STATIC_PRESS	55.11	100.99	None	None	None	None
MEAN_SURF_RAD_TEMP	-2.9	52.5	None	None	None	None
MEAN_DOWN_TOTAL_RAD	52.5	941.5	None	None	None	None
MEAN_UP_TOTAL_RAD	.1	467.6	None	None	None	None
MEAN_DOWN_LONGWAVE_RAD	151.1	404	None	None	None	None
MEAN_UP_LONGWAVE_RAD	296.9	481	None	None	None	None
MEAN_NET_RAD	44.1	653.3	None	None	None	None
MEAN_UP_PPFD			-999	None	None	None
MEAN_DOWN_PPFD			-999	None	None	None
MEAN_AUX_RAD			-999	None	None	None
MEAN_GREEN_INDEX	-5.95	.06	None	None	None	None
MEAN_CO2_CONC	287.3	386.3	None	None	None	None
MEAN_O3_CONC	1.86	77.26	None	None	None	None
MEAN_CH4_CONC			-999	None	None	None
MEAN_SAT_SIM_CH1			-999	None	None	None
MEAN_SAT_SIM_CH2			-999	None	None	None
MEAN_SAT_SIM_CH3			-999	None	None	None
MEAN_SAT_SIM_CH4			-999	None	None	None
SDEV_AIR_TEMP	.04	3.5	None	None	None	None
SDEV_POTNTL_TEMP	.06	3.77	None	None	None	None
SDEV_H2O_MIX_RATIO	.03	8.97	None	None	None	None
SDEV_U_COMPNT_WIND_VELOC	.15	4.06	None	None	None	None
SDEV_V_COMPNT_WIND_VELOC	.26	3.5	None	None	None	None
SDEV_STATIC_PRESS	.2	33.4	None	None	None	None
SDEV_SURF_RAD_TEMP	.5	18.49	None	None	None	None
SDEV_DOWN_TOTAL_RAD	4	305.3	None	None	None	None
SDEV_UP_TOTAL_RAD	1.2	121.3	None	None	None	None
SDEV_DOWN_LONGWAVE_RAD	.7	32.3	None	None	None	None
SDEV_UP_LONGWAVE_RAD	1.1	23.9	None	None	None	None
SDEV_NET_RAD			-999	None	None	None
SDEV_UP_PPFD			-999	None	None	None
SDEV_DOWN_PPFD			-999	None	None	None

SDEV_AUX_RAD			-999	None	None	None
SDEV_GREEN_INDEX			-999	None	None	None
SDEV_CO2_CONC	.3	98.3	None	None	None	None
SDEV_O3_CONC	.52	30.35	None	None	None	None
SDEV_CH4_CONC			-999	None	None	None
SDEV_SAT_SIM_CH1			-999	None	None	None
SDEV_SAT_SIM_CH2			-999	None	None	None
SDEV_SAT_SIM_CH3			-999	None	None	None
SDEV_SAT_SIM_CH4			-999	None	None	None
TREND_AIR_TEMP	-.00005874	.0001612	None	None	None	None
TREND_POTNTL_TEMP	-.00006039	.0001817	None	None	None	None
TREND_H2O_MIX_RATIO	-.00003419	.000228	None	None	None	None
TREND_U_COMPNT_WIND_VELOC	-.0001961	.0001637	None	None	None	None
TREND_V_COMPNT_WIND_VELOC	-.0000659	.0001471	None	None	None	None
TREND_STATIC_PRESS	-.0003618	.0004317	None	None	None	None
TREND_SURF_RAD_TEMP	-.001087	.001133	None	None	None	None
TREND_DOWN_TOTAL_RAD	-.00973	.01152	None	None	None	None
TREND_UP_TOTAL_RAD	-.001914	.01417	None	None	None	None
TREND_DOWN_LONGWAVE_RAD	-.0007797	.0006876	None	None	None	None
TREND_UP_LONGWAVE_RAD	-.001193	.002949	None	None	None	None
TREND_GREEN_INDEX			-999	None	None	None
TREND_CO2_CONC	-.000982	.002098	None	None	None	None
TREND_O3_CONC	-.001641	.0006959	None	None	None	None
TREND_CH4_CONC			-999	None	None	None
SDEV_VERT_GUST_RAW	.12	1.74	None	None	None	None
SDEV_U_COMPNT_WIND_VELOC_RAW	.15	4.06	None	None	None	None
SDEV_V_COMPNT_WIND_VELOC_RAW	.26	3.5	None	None	None	None
SDEV_ALONG_WIND_RAW	.11	4.43	None	None	None	None
SDEV_CROSS_WIND_RAW	.3	4.23	None	None	None	None
SDEV_POTNTL_TEMP_RAW	.06	3.77	None	None	None	None
SDEV_H2O_MIX_RATIO_RAW	.03	8.97	None	None	None	None
SDEV_CO2_MIX_RATIO_RAW	.3	98.3	None	None	None	None
SDEV_O3_CONC_RAW	.52	30.35	None	None	None	None
SDEV_CH4_CONC_RAW			-999	None	None	None
SKEW_VERT_GUST_RAW	-1.27	2.15	None	None	None	None
SKEW_U_COMPNT_WIND_VELOC_RAW	-1.54	.97	None	None	None	None
SKEW_V_COMPNT_WIND_VELOC_RAW	-1.21	1.25	None	None	None	None
SKEW_ALONG_WIND_RAW	-1.56	.82	None	None	None	None
SKEW_CROSS_WIND_RAW	-1.05	1.11	None	None	None	None
SKEW_POTNTL_TEMP_RAW	-1.51	1.79	None	None	None	None
SKEW_H2O_MIX_RATIO_RAW	-5.62	5.85	None	None	None	None
SKEW_CO2_MIX_RATIO	-5.96	5.42	None	None	None	None
SKEW_O3_CONC_RAW	-4.62	3.26	None	None	None	None

SKEW_CH4_CONC_RAW			-999	None	None	None
KURT_VERT_GUST_RAW	1.7	15	None	None	None	None
KURT_U_COMPNT_WIND_VELOC_RAW	1.45	5.55	None	None	None	None
KURT_V_COMPNT_WIND_VELOC_RAW	1.46	4.62	None	None	None	None
KURT_ALONG_WIND_RAW	1.45	6.77	None	None	None	None
KURT_CROSS_WIND_RAW	1.47	6.75	None	None	None	None
KURT_POTNTL_TEMP_RAW	1.25	11.96	None	None	None	None
KURT_H2O_MIX_RATIO_RAW	1.12	86.3	None	None	None	None
KURT_CO2_MIX_RATIO_RAW	1.02	63.06	None	None	None	None
KURT_O3_CONC_RAW	1.01	24.19	None	None	None	None
KURT_CH4_CONC_RAW			-999	None	None	None
CORC_VERT_U_WIND_COMPNT_RAW	-.79	.41	None	None	None	None
CORC_VERT_V_WIND_COMPNT_RAW	-.58	.43	None	None	None	None
CORC_VERT_ALONG_WIND_RAW	-.76	.55	None	None	None	None
CORC_VERT_CROSS_WIND_RAW	-.45	.44	None	None	None	None
CORC_VERT_POTNTL_TEMP_RAW	-.45	.68	None	None	None	None
CORC_VERT_H2O_MIX_RATIO_RAW	-.46	.46	None	None	None	None
CORC_VERT_CO2_MIX_RATIO_RAW	-.41	.37	None	None	None	None
CORC_VERT_O3_CONC_RAW	-.5	.38	None	None	None	None
CORC_VERT_CH4_CONC_RAW			-999	None	None	None
CORC_POTNTL_H2O_MIX_RATIO_RAW	-.97	.96	None	None	None	None
MMNTM_FLUX_V_WIND_COMPNT_RAW	-.9256	.6876	None	None	None	None
MMNTM_FLUX_U_WIND_COMPNT_RAW	-.8931	.7499	None	None	None	None
MMNTM_FLUX_ALONG_MEAN_WIND_RAW	-1.1008	.504	None	None	None	None
MMNTM_FLUX_CROSS_MEAN_WIND_RAW	-.2379	.5133	None	None	None	None
SENSIBLE_HEAT_FLUX_RAW	-170.1	617.5	None	None	None	None
LATENT_HEAT_FLUX_RAW	-375.1	1134.6	None	None	None	None
CO2_FLUX_RAW	-24.896	232.014	None	None	None	None
O3_FLUX_RAW	-2.438	.632	None	None	None	None
O3_DEPOSITION_VELOC_RAW	-39.61	20.7	None	None	None	None
CH4_FLUX_RAW			-999	None	None	None
AIR_DENSITY_CONSTANT	.733	1.232	None	None	None	None
SPECIFIC_HEAT_CONSTANT	1003.6	1017.3	None	None	None	None

LATENT_HEAT_VAP_CONSTANT	2432157	2527555	None	None	None	None
DRY_AIR_GAS_CONSTANT	287.04	287.04	None	None	None	None
SDEV_VERT_GUST_DET	.12	1.74	None	None	None	None
SDEV_U_COMPNT_WIND_VELOC_DET	.1	3.4	None	None	None	None
SDEV_V_COMPNT_WIND_VELOC_DET	.13	3.18	None	None	None	None
SDEV_ALONG_WIND_DET	.1	4.21	None	None	None	None
SDEV_CROSS_WIND_DET	.16	3.34	None	None	None	None
SDEV_POTNTL_TEMP_DET	.05	2.74	None	None	None	None
SDEV_H2O_MIX_RATIO_DET	.02	8.65	None	None	None	None
SDEV_CO2_MIX_RATIO	.3	89.6	None	None	None	None
SDEV_O3_CONC_DET	.43	15.03	None	None	None	None
SDEV_CH4_CONC_DET			-999	None	None	None
SKEW_VERT_GUST_DET	-1.14	2.09	None	None	None	None
SKEW_U_COMPNT_WIND_VELOC_DET	-1.52	.93	None	None	None	None
SKEW_V_COMPNT_WIND_VELOC_DET	-.99	.88	None	None	None	None
SKEW_ALONG_WIND_DET	-1.43	1.02	None	None	None	None
SKEW_CROSS_WIND_DET	-1.3	1.24	None	None	None	None
SKEW_POTNTL_TEMP_DET	-1.95	2.25	None	None	None	None
SKEW_H2O_MIX_RATIO_DET	-6.02	6.28	None	None	None	None
SKEW_CO2_MIX_RATIO_DET	-5.62	4.69	None	None	None	None
SKEW_O3_CONC_DET	-4.37	3.77	None	None	None	None
SKEW_CH4_CONC_DET			-999	None	None	None
KURT_VERT_GUST_DET	2.12	15.1	None	None	None	None
KURT_U_COMPNT_WIND_VELOC_DET	1.64	6.79	None	None	None	None
KURT_V_COMPNT_WIND_VELOC_DET	1.59	5.05	None	None	None	None
KURT_ALONG_WIND_DET	1.76	8.08	None	None	None	None
KURT_CROSS_WIND_DET	1.68	5.93	None	None	None	None
KURT_POTNTL_TEMP_DET	1.42	18.07	None	None	None	None
KURT_H2O_MIX_RATIO_DET	1.51	91.98	None	None	None	None
KURT_CO2_MIX_RATIO_DET	1.64	74.26	None	None	None	None
KURT_O3_CONC_DET	1.53	25.29	None	None	None	None
KURT_CH4_CONC_DET			-999	None	None	None
CORC_VERT_U_WIND_COMPNT_DET	-.48	.38	None	None	None	None
CORC_VERT_V_WIND_COMPNT_DET	-.4	.67	None	None	None	None
CORC_VERT_ALONG_WIND_DET	-.44	.3	None	None	None	None
CORC_VERT_CROSS_WIND_DET	-.3	.67	None	None	None	None
CORC_VERT_POTNTL_TEMP_DET	-.48	.66	None	None	None	None

CORC_VERT_H2O_MIX_RATIO_DET	-.51	.46	None	None	None	None
CORC_VERT_CO2_MIX_RATIO_DET	-.44	.6	None	None	None	None
CORC_VERT_O3_CONC_DET	-.42	.31	None	None	None	None
CORC_VERT_CH4_CONC_DET			-999	None	None	None
CORC_POTNTL_H2O_MIX_RATIO_DET	-.98	.72	None	None	None	None
MMNTM_FLUX_U_WIND_COMPNT_DET	-.9179	.7006	None	None	None	None
MMNTM_FLUX_V_WIND_COMPNT_DET	-.8943	.5999	None	None	None	None
MMNTM_FLUX_ALONG_MEAN_WIND_DET	-1.0931	.5039	None	None	None	None
MMNTM_FLUX_CROSS_MEAN_WIND_DET	-.1774	.4793	None	None	None	None
SENSIBLE_HEAT_FLUX_DET	-140.9	363.2	None	None	None	None
LATENT_HEAT_FLUX_DET	-176.8	1035.3	None	None	None	None
CO2_FLUX_DET	-33.802	253.631	None	None	None	None
O3_FLUX_DET	-1.29	.794	None	None	None	None
O3_DEPOSITION_VELOC_DET	-40.21	15.92	None	None	None	None
CH4_FLUX_DET			-999	None	None	None
CRTFCN_CODE	CPI	CPI	None	None	None	None
REVISION_DATE	22-JAN-99	22-JAN-99	None	None	None	None

The following table gives information about the parameter values found in the moving window data files on the CD-ROM.

Column Name	Minimum Data Value	Maximum Data Value	Missng Data Value	Unrel Data Value	Below Detect Limit	Data Not Cllctd
SPATIAL_COVERAGE	N/A	N/A	None	None	None	None
RUN_START_DATE	25-MAY-94	16-SEP-94	None	None	None	None
RUN_START_TIME	151323	221715	None	None	None	None
RUN_END_DATE	25-MAY-94	16-SEP-94	None	None	None	None
RUN_END_TIME	151453	222403	None	None	None	None
FLUX_MISSION_DESIGNATOR	CS	RT	None	None	None	None
FLUX_MISSION_NUM	1	1	None	None	None	None
FLUX_PASS_NUM	1	17	None	None	None	None
FLUX_SEGMENT_NUM	1	47	None	None	None	None
START_LATITUDE	52.4389	60.5239	None	None	None	None
START_LONGITUDE	-106.581	-94.1065	None	None	None	None
END_LATITUDE	52.7987	60.5239	None	None	None	None
END_LONGITUDE	-106.577	-94.0954	None	None	None	None
START_BOREAS_X	294.45	965.99	None	None	None	None
START_BOREAS_Y	169.6	1153.44	None	None	None	None
END_BOREAS_X	293.62	964.18	None	None	None	None

END_BOREAS_Y	209.49	1153.62	None	None	None	None
HEADING	2.7	356.6	None	None	None	None
MEAN_PRESS_ALTITUDE	22.5	2373.7	None	None	None	None
MEAN_RADAR_ALTITUDE	33.8	1969.8	None	None	None	None
MEAN_WIND_DIR	.2	359.8	None	None	None	None
MEAN_WIND_SPEED	.16	13.94	None	None	None	None
MEAN_AIR_TEMP	-1.84	28.65	None	None	None	None
MEAN_POTNTL_TEMP	282.83	305.49	None	None	None	None
MEAN_H2O_MIX_RATIO	1.53	14.79	None	None	None	None
MEAN_U_COMPNT_WIND_VELOC	-11.35	12.25	None	None	None	None
MEAN_V_COMPNT_WIND_VELOC	-13.78	11.07	None	None	None	None
MEAN_STATIC_PRESS	75.87	101.05	None	None	None	None
MEAN_SURF_RAD_TEMP	8.1	51.6	None	None	None	None
MEAN_DOWN_TOTAL_RAD	37	880.5	None	None	None	None
MEAN_UP_TOTAL_RAD	1.8	189.2	None	None	None	None
MEAN_DOWN_LONGWAVE_RAD	247.9	413.8	None	None	None	None
MEAN_UP_LONGWAVE_RAD	386.7	490.7	None	None	None	None
MEAN_NET_RAD	20.4	713.4	None	None	None	None
MEAN_UP_PPFD			-999	None	None	None
MEAN_DOWN_PPFD			-999	None	None	None
MEAN_AUX_RAD			-999	None	None	None
MEAN_GREEN_INDEX	-9.27	-.04	None	None	None	None
MEAN_CO2_CONC	259.7	381.2	None	None	None	None
MEAN_O3_CONC	15.5	60.03	None	None	None	None
MEAN_CH4_CONC			-999	None	None	None
MEAN_SAT_SIM_CH1			-999	None	None	None
MEAN_SAT_SIM_CH2			-999	None	None	None
MEAN_SAT_SIM_CH3			-999	None	None	None
MEAN_SAT_SIM_CH4			-999	None	None	None
SDEV_AIR_TEMP	.09	1.5	None	None	None	None
SDEV_POTNTL_TEMP	.07	1.6	None	None	None	None
SDEV_H2O_MIX_RATIO	.04	3.51	None	None	None	None
SDEV_U_COMPNT_WIND_VELOC	.4	3.28	None	None	None	None
SDEV_V_COMPNT_WIND_VELOC	.19	2.49	None	None	None	None
SDEV_STATIC_PRESS	.2	5.4	None	None	None	None
SDEV_SURF_RAD_TEMP	.28	18.07	None	None	None	None
SDEV_DOWN_TOTAL_RAD	4.6	344.1	None	None	None	None
SDEV_UP_TOTAL_RAD	1	95.4	None	None	None	None
SDEV_DOWN_LONGWAVE_RAD	.8	29	None	None	None	None
SDEV_UP_LONGWAVE_RAD	1.2	33.9	None	None	None	None
SDEV_NET_RAD			-999	None	None	None
SDEV_UP_PPFD			-999	None	None	None
SDEV_DOWN_PPFD			-999	None	None	None
SDEV_AUX_RAD			-999	None	None	None
SDEV_GREEN_INDEX			-999	None	None	None
SDEV_CO2_CONC	.2	46.8	None	None	None	None
SDEV_O3_CONC	.38	6.44	None	None	None	None
SDEV_CH4_CONC			-999	None	None	None

SDEV_SAT_SIM_CH1			-999	None	None	None
SDEV_SAT_SIM_CH2			-999	None	None	None
SDEV_SAT_SIM_CH3			-999	None	None	None
SDEV_SAT_SIM_CH4			-999	None	None	None
TREND_AIR_TEMP	-.00009573	.0001259	None	None	None	None
TREND_POTNTL_TEMP	-.0001016	.0001344	None	None	None	None
TREND_H2O_MIX_RATIO	-.00007517	.0002054	None	None	None	None
TREND_U_COMPNT_WIND_VELOC	-.0001931	.0002301	None	None	None	None
TREND_V_COMPNT_WIND_VELOC	-.0001782	.0001482	None	None	None	None
TREND_STATIC_PRESS	-.0004336	.0004361	None	None	None	None
TREND_SURF_RAD_TEMP	-.001138	.001083	None	None	None	None
TREND_DOWN_TOTAL_RAD	-.02052	.01724	None	None	None	None
TREND_UP_TOTAL_RAD	-.005335	.00497	None	None	None	None
TREND_DOWN_LONGWAVE_RAD	-.002167	.001768	None	None	None	None
TREND_UP_LONGWAVE_RAD	-.001807	.001669	None	None	None	None
TREND_GREEN_INDEX			-999	None	None	None
TREND_CO2_CONC	-.0009954	.003364	None	None	None	None
TREND_O3_CONC	-.0004359	.0004167	None	None	None	None
TREND_CH4_CONC			-999	None	None	None
SDEV_VERT_GUST_RAW	.2	2	None	None	None	None
SDEV_U_COMPNT_WIND_VELOC_RAW	.4	3.28	None	None	None	None
SDEV_V_COMPNT_WIND_VELOC_RAW	.19	2.49	None	None	None	None
SDEV_ALONG_WIND_RAW	.28	2.58	None	None	None	None
SDEV_CROSS_WIND_RAW	.34	3.26	None	None	None	None
SDEV_POTNTL_TEMP_RAW	.07	1.6	None	None	None	None
SDEV_H2O_MIX_RATIO_RAW	.04	3.51	None	None	None	None
SDEV_CO2_MIX_RATIO_RAW	.2	46.8	None	None	None	None
SDEV_O3_CONC_RAW	.38	6.44	None	None	None	None
SDEV_CH4_CONC_RAW			-999	None	None	None
SKEW_VERT_GUST_RAW	-2.87	2.01	None	None	None	None
SKEW_U_COMPNT_WIND_VELOC_RAW	-2.53	1.7	None	None	None	None
SKEW_V_COMPNT_WIND_VELOC_RAW	-1.22	1.33	None	None	None	None
SKEW_ALONG_WIND_RAW	-2.33	1	None	None	None	None
SKEW_CROSS_WIND_RAW	-.94	1.93	None	None	None	None
SKEW_POTNTL_TEMP_RAW	-3.52	2.41	None	None	None	None
SKEW_H2O_MIX_RATIO_RAW	-3.1	5.76	None	None	None	None
SKEW_CO2_MIX_RATIO	-2.39	9.34	None	None	None	None
SKEW_O3_CONC_RAW	-3.85	4.29	None	None	None	None
SKEW_CH4_CONC_RAW			-999	None	None	None
KURT_VERT_GUST_RAW	1.59	19.44	None	None	None	None
KURT_U_COMPNT_WIND_VELOC_RAW	1.54	13.14	None	None	None	None
KURT_V_COMPNT_WIND_	1.87	8.13	None	None	None	None

VELOC_RAW						
KURT_ALONG_WIND_RAW	1.83	13.94	None	None	None	None
KURT_CROSS_WIND_RAW	1.57	8.22	None	None	None	None
KURT_POTNTL_TEMP_RAW	1.33	26.25	None	None	None	None
KURT_H2O_MIX_RATIO_ RAW	1.3	73.09	None	None	None	None
KURT_CO2_MIX_RATIO_ RAW	1.21	98.27	None	None	None	None
KURT_O3_CONC_RAW	1.37	35.59	None	None	None	None
KURT_CH4_CONC_RAW			-999	None	None	None
CORC_VERT_U_WIND_ COMPNT_RAW	-.83	.48	None	None	None	None
CORC_VERT_V_WIND_ COMPNT_RAW	-.47	.53	None	None	None	None
CORC_VERT_ALONG_WIND_ RAW	-.65	.37	None	None	None	None
CORC_VERT_CROSS_WIND_ RAW	-.36	.86	None	None	None	None
CORC_VERT_POTNTL_ TEMP_RAW	-.4	.73	None	None	None	None
CORC_VERT_H2O_MIX_ RATIO_RAW	-.39	.57	None	None	None	None
CORC_VERT_CO2_MIX_ RATIO_RAW	-.6	.64	None	None	None	None
CORC_VERT_O3_CONC_ RAW	-.47	.46	None	None	None	None
CORC_VERT_CH4_CONC_ RAW			-999	None	None	None
CORC_POTNTL_H2O_MIX_ RATIO_RAW	0	0	None	None	None	None
MMNTM_FLUX_V_WIND_ COMPNT_RAW	-1.1551	.9905	None	None	None	None
MMNTM_FLUX_U_WIND_ COMPNT_RAW	-1.1713	1.0699	None	None	None	None
MMNTM_FLUX_ALONG_ MEAN_WIND_RAW	-1.4153	.624	None	None	None	None
MMNTM_FLUX_CROSS_ MEAN_WIND_RAW	-.5474	.6128	None	None	None	None
SENSIBLE_HEAT_FLUX_ RAW	-145.4	365.8	None	None	None	None
LATENT_HEAT_FLUX_RAW	-607	1855.4	None	None	None	None
CO2_FLUX_RAW	-19.857	119.849	None	None	None	None
O3_FLUX_RAW	-1.864	.961	None	None	None	None
O3_DEPOSITION_VELOC_ RAW	-65.01	74.09	None	None	None	None
CH4_FLUX_RAW			-999	None	None	None
AIR_DENSITY_CONSTANT	.967	1.234	None	None	None	None
SPECIFIC_HEAT_ CONSTANT	1005.5	1017.8	None	None	None	None
LATENT_HEAT_VAP_ CONSTANT	2431824	2504389	None	None	None	None
DRY_AIR_GAS_CONSTANT	287.04	287.04	None	None	None	None
SDEV_VERT_GUST_DET	.07	1.95	None	None	None	None
SDEV_U_COMPNT_WIND_	.21	2.79	None	None	None	None

VELOC_DET						
SDEV_V_COMPNT_WIND_ VELOC_DET	.17	2.45	None	None	None	None
SDEV_ALONG_WIND_DET	.21	2.49	None	None	None	None
SDEV_CROSS_WIND_DET	.17	2.61	None	None	None	None
SDEV_POTNTL_TEMP_DET	.05	.83	None	None	None	None
SDEV_H2O_MIX_RATIO_ DET	.03	2.55	None	None	None	None
SDEV_CO2_MIX_RATIO	.2	25.7	None	None	None	None
SDEV_O3_CONC_DET	.36	5.14	None	None	None	None
SDEV_CH4_CONC_DET			-999	None	None	None
SKEW_VERT_GUST_DET	-2.3	1.98	None	None	None	None
SKEW_U_COMPNT_WIND_ VELOC_DET	-1.93	1.55	None	None	None	None
SKEW_V_COMPNT_WIND_ VELOC_DET	-1.12	1.3	None	None	None	None
SKEW_ALONG_WIND_DET	-1.94	.9	None	None	None	None
SKEW_CROSS_WIND_DET	-.95	1.43	None	None	None	None
SKEW_POTNTL_TEMP_DET	-4.42	2.57	None	None	None	None
SKEW_H2O_MIX_RATIO_ DET	-2.27	6.15	None	None	None	None
SKEW_CO2_MIX_RATIO_ DET	-2.55	9.22	None	None	None	None
SKEW_O3_CONC_DET	-3.76	4.65	None	None	None	None
SKEW_CH4_CONC_DET			-999	None	None	None
KURT_VERT_GUST_DET	2.37	19.4	None	None	None	None
KURT_U_COMPNT_WIND_ VELOC_DET	1.67	11.42	None	None	None	None
KURT_V_COMPNT_WIND_ VELOC_DET	1.92	8.35	None	None	None	None
KURT_ALONG_WIND_DET	1.98	12.53	None	None	None	None
KURT_CROSS_WIND_DET	1.67	8.52	None	None	None	None
KURT_POTNTL_TEMP_DET	1.72	34.76	None	None	None	None
KURT_H2O_MIX_RATIO_ DET	1.67	77.59	None	None	None	None
KURT_CO2_MIX_RATIO_ DET	1.58	97.19	None	None	None	None
KURT_O3_CONC_DET	1.88	34.95	None	None	None	None
KURT_CH4_CONC_DET			-999	None	None	None
CORC_VERT_U_WIND_ COMPNT_DET	-.47	.48	None	None	None	None
CORC_VERT_V_WIND_ COMPNT_DET	-.48	.51	None	None	None	None
CORC_VERT_ALONG_WIND_ DET	-.51	.37	None	None	None	None
CORC_VERT_CROSS_WIND_ DET	-.34	.34	None	None	None	None
CORC_VERT_POTNTL_ TEMP_DET	-.4	.69	None	None	None	None
CORC_VERT_H2O_MIX_ RATIO_DET	-.24	.59	None	None	None	None
CORC_VERT_CO2_MIX_ RATIO_DET	-.67	.25	None	None	None	None
CORC_VERT_O3_CONC_	-.46	.22	None	None	None	None

DET						
CORC_VERT_CH4_CONC_			-999	None	None	None
DET						
CORC_POTNTL_H2O_MIX_	0	0	None	None	None	None
RATIO_DET						
MMNTM_FLUX_U_WIND_	-1.1509	.9931	None	None	None	None
COMPNT_DET						
MMNTM_FLUX_V_WIND_	-1.0834	1.0582	None	None	None	None
COMPNT_DET						
MMNTM_FLUX_ALONG_	-1.4115	.6198	None	None	None	None
MEAN_WIND_DET						
MMNTM_FLUX_CROSS_	-.5177	.6539	None	None	None	None
MEAN_WIND_DET						
SENSIBLE_HEAT_FLUX_	-86.6	340.4	None	None	None	None
DET						
LATENT_HEAT_FLUX_DET	-373	1315.8	None	None	None	None
CO2_FLUX_DET	-26.292	121.542	None	None	None	None
O3_FLUX_DET	-1.333	.529	None	None	None	None
O3_DEPOSITION_VELOC_	-55.34	23.8	None	None	None	None
DET						
CH4_FLUX_DET			-999	None	None	None
CRTFCN_CODE	CPI	CPI	None	None	None	None
REVISION_DATE	22-JAN-99	22-JAN-99	None	None	None	None

Minimum Data Value -- The minimum value found in the column.
Maximum Data Value -- The maximum value found in the column.
Missng Data Value -- The value that indicates missing data. This is used to indicate that an attempt was made to determine the parameter value, but the attempt was unsuccessful.
Unrel Data Value -- The value that indicates unreliable data. This is used to indicate an attempt was made to determine the parameter value, but the value was deemed to be unreliable by the analysis personnel.
Below Detect Limit -- The value that indicates parameter values below the instruments detection limits. This is used to indicate that an attempt was made to determine the parameter value, but the analysis personnel determined that the parameter value was below the detection limit of the instrumentation.
Data Not Cllctd -- This value indicates that no attempt was made to determine the parameter value. This usually indicates that BORIS combined several similar but not identical data sets into the same data base table but this particular science team did not measure that parameter.

Blank -- Indicates that blank spaces are used to denote that type of value.
N/A -- Indicates that the value is not applicable to the respective column.
None -- Indicates that no values of that sort were found in the column.

7.4 Sample Data Record

The following are wrapped versions of data records from a sample aircraft flux data file on the CD-ROM:

```
SPATIAL_COVERAGE,RUN_START_DATE,RUN_START_TIME,RUN_END_DATE,RUN_END_TIME,
FLUX_MISSION_DESIGNATOR,FLUX_MISSION_NUM,FLUX_PASS_NUM,FLUX_SEGMENT_NUM,
START_LATITUDE,START_LONGITUDE,END_LATITUDE,END_LONGITUDE,START_BOREAS_X,
START_BOREAS_Y,END_BOREAS_X,END_BOREAS_Y,HEADING,MEAN_PRESS_ALTITUDE,
MEAN_RADAR_ALTITUDE,MEAN_WIND_DIR,MEAN_WIND_SPEED,MEAN_AIR_TEMP,
MEAN_POTNTL_TEMP,MEAN_H2O_MIX_RATIO,MEAN_U_COMPNT_WIND_VELOC,
MEAN_V_COMPNT_WIND_VELOC,MEAN_STATIC_PRESS,MEAN_SURF_RAD_TEMP,
MEAN_DOWN_TOTAL_RAD,MEAN_UP_TOTAL_RAD,MEAN_DOWN_LONGWAVE_RAD,
MEAN_UP_LONGWAVE_RAD,MEAN_NET_RAD,MEAN_UP_PPFD,MEAN_DOWN_PPFD,MEAN_AUX_RAD,
MEAN_GREEN_INDEX,MEAN_CO2_CONC,MEAN_O3_CONC,MEAN_CH4_CONC,MEAN_SAT_SIM_CH1,
MEAN_SAT_SIM_CH2,MEAN_SAT_SIM_CH3,MEAN_SAT_SIM_CH4,SDEV_AIR_TEMP,
SDEV_POTNTL_TEMP,SDEV_H2O_MIX_RATIO,SDEV_U_COMPNT_WIND_VELOC,
SDEV_V_COMPNT_WIND_VELOC,SDEV_STATIC_PRESS,SDEV_SURF_RAD_TEMP,
SDEV_DOWN_TOTAL_RAD,SDEV_UP_TOTAL_RAD,SDEV_DOWN_LONGWAVE_RAD,
SDEV_UP_LONGWAVE_RAD,SDEV_NET_RAD,SDEV_UP_PPFD,SDEV_DOWN_PPFD,SDEV_AUX_RAD,
SDEV_GREEN_INDEX,SDEV_CO2_CONC,SDEV_O3_CONC,SDEV_CH4_CONC,SDEV_SAT_SIM_CH1,
SDEV_SAT_SIM_CH2,SDEV_SAT_SIM_CH3,SDEV_SAT_SIM_CH4,TREND_AIR_TEMP,
TREND_POTNTL_TEMP,TREND_H2O_MIX_RATIO,TREND_U_COMPNT_WIND_VELOC,
TREND_V_COMPNT_WIND_VELOC,TREND_STATIC_PRESS,TREND_SURF_RAD_TEMP,
TREND_DOWN_TOTAL_RAD,TREND_UP_TOTAL_RAD,TREND_DOWN_LONGWAVE_RAD,
TREND_UP_LONGWAVE_RAD,TREND_GREEN_INDEX,TREND_CO2_CONC,TREND_O3_CONC,
TREND_CH4_CONC,SDEV_VERT_GUST_RAW,SDEV_U_COMPNT_WIND_VELOC_RAW,
SDEV_V_COMPNT_WIND_VELOC_RAW,SDEV_ALONG_WIND_RAW,SDEV_CROSS_WIND_RAW,
SDEV_POTNTL_TEMP_RAW,SDEV_H2O_MIX_RATIO_RAW,SDEV_CO2_MIX_RATIO_RAW,
SDEV_O3_CONC_RAW,SDEV_CH4_CONC_RAW,SKEW_VERT_GUST_RAW,
SKEW_U_COMPNT_WIND_VELOC_RAW,SKEW_V_COMPNT_WIND_VELOC_RAW,SKEW_ALONG_WIND_RAW,
SKEW_CROSS_WIND_RAW,SKEW_POTNTL_TEMP_RAW,SKEW_H2O_MIX_RATIO_RAW,
SKEW_CO2_MIX_RATIO,SKEW_O3_CONC_RAW,SKEW_CH4_CONC_RAW,KURT_VERT_GUST_RAW,
KURT_U_COMPNT_WIND_VELOC_RAW,KURT_V_COMPNT_WIND_VELOC_RAW,KURT_ALONG_WIND_RAW,
KURT_CROSS_WIND_RAW,KURT_POTNTL_TEMP_RAW,KURT_H2O_MIX_RATIO_RAW,
KURT_CO2_MIX_RATIO_RAW,KURT_O3_CONC_RAW,KURT_CH4_CONC_RAW,
CORC_VERT_U_WIND_COMPNT_RAW,CORC_VERT_V_WIND_COMPNT_RAW,
CORC_VERT_ALONG_WIND_RAW,CORC_VERT_CROSS_WIND_RAW,CORC_VERT_POTNTL_TEMP_RAW,
CORC_VERT_H2O_MIX_RATIO_RAW,CORC_VERT_CO2_MIX_RATIO_RAW,CORC_VERT_O3_CONC_RAW,
CORC_VERT_CH4_CONC_RAW,CORC_POTNTL_H2O_MIX_RATIO_RAW,
MMNTM_FLUX_V_WIND_COMPNT_RAW,MMNTM_FLUX_U_WIND_COMPNT_RAW,
MMNTM_FLUX_ALONG_MEAN_WIND_RAW,MMNTM_FLUX_CROSS_MEAN_WIND_RAW,
SENSIBLE_HEAT_FLUX_RAW,LATENT_HEAT_FLUX_RAW,CO2_FLUX_RAW,O3_FLUX_RAW,
O3_DEPOSITION_VELOC_RAW,CH4_FLUX_RAW,AIR_DENSITY_CONSTANT,
SPECIFIC_HEAT_CONSTANT,LATENT_HEAT_VAP_CONSTANT,DRY_AIR_GAS_CONSTANT,
SDEV_VERT_GUST_DET,SDEV_U_COMPNT_WIND_VELOC_DET,SDEV_V_COMPNT_WIND_VELOC_DET,
SDEV_ALONG_WIND_DET,SDEV_CROSS_WIND_DET,SDEV_POTNTL_TEMP_DET,
SDEV_H2O_MIX_RATIO_DET,SDEV_CO2_MIX_RATIO,SDEV_O3_CONC_DET,SDEV_CH4_CONC_DET,
SKEW_VERT_GUST_DET,SKEW_U_COMPNT_WIND_VELOC_DET,SKEW_V_COMPNT_WIND_VELOC_DET,
SKEW_ALONG_WIND_DET,SKEW_CROSS_WIND_DET,SKEW_POTNTL_TEMP_DET,
SKEW_H2O_MIX_RATIO_DET,SKEW_CO2_MIX_RATIO_DET,SKEW_O3_CONC_DET,
SKEW_CH4_CONC_DET,KURT_VERT_GUST_DET,KURT_U_COMPNT_WIND_VELOC_DET,
KURT_V_COMPNT_WIND_VELOC_DET,KURT_ALONG_WIND_DET,KURT_CROSS_WIND_DET,
KURT_POTNTL_TEMP_DET,KURT_H2O_MIX_RATIO_DET,KURT_CO2_MIX_RATIO_DET,
KURT_O3_CONC_DET,KURT_CH4_CONC_DET,CORC_VERT_U_WIND_COMPNT_DET,
```

```
CORC_VERT_V_WIND_COMPNT_DET,CORC_VERT_ALONG_WIND_DET,CORC_VERT_CROSS_WIND_DET,
CORC_VERT_POTNTL_TEMP_DET,CORC_VERT_H2O_MIX_RATIO_DET,
CORC_VERT_CO2_MIX_RATIO_DET,CORC_VERT_O3_CONC_DET,CORC_VERT_CH4_CONC_DET,
CORC_POTNTL_H2O_MIX_RATIO_DET,MMNTM_FLUX_U_WIND_COMPNT_DET,
MMNTM_FLUX_V_WIND_COMPNT_DET,MMNTM_FLUX_ALONG_MEAN_WIND_DET,
MMNTM_FLUX_CROSS_MEAN_WIND_DET,SENSIBLE_HEAT_FLUX_DET,LATENT_HEAT_FLUX_DET,
CO2_FLUX_DET,O3_FLUX_DET,O3_DEPOSITION_VELOC_DET,CH4_FLUX_DET,CRTFCN_CODE,
REVISION_DATE
'SSA',21-JUL-94,164723,21-JUL-94,165935,'RT',1,1,0,52.5859,-106.56,53.3622,
-106.559,300.71,185.93,295.25,272.17,232.5,3161.8,2809.8,292.4,4.87,7.83,312.84,
1.12,4.5,-1.86,68.67,27.9,848.8,138.7,282.6,430.3,562.4,-999.0,-999.0,-999.0,
-.7,321.4,41.37,-999.0,-999.0,-999.0,-999.0,-999.0,.23,.24,.51,.23,.69,.4,3.26,
12.1,16.8,1.5,2.1,-999.0,-999.0,-999.0,-999.0,-999.0,1.0,8.57,-999.0,-999.0,
-999.0,-999.0,-999.0,.000008377,.00000879,-.00001233,.000002064,.00002398,
.000004126,-.00005163,.000121,-.0006062,-.00004628,-.00001755,-999.0,.00001519,
.0002531,-999.0,.16,.23,.69,.36,.63,.24,.51,1.0,8.57,-999.0,.18,-.13,.14,-.24,
.05,.3,-.64,.12,.63,-999.0,2.57,2.06,2.71,2.91,2.47,1.69,1.97,3.98,1.71,-999.0,
-.35,.04,-.23,-.01,-.07,-.08,-.02,.05,-999.0,-.79,-.0125,.0043,-.0132,-.0008,.6,
-12.8,-.099,.07,.82,-999.0,.851,1005.1,2481374,287.04,.16,.22,.33,.31,.25,.1,.4,
.9,5.76,-999.0,.23,-.17,-.63,.12,-.69,-.15,-.01,.05,-.11,-999.0,2.61,2.22,2.71,
2.22,3.0,2.83,1.66,4.24,1.75,-999.0,-.35,.19,-.31,.12,-.04,-.14,0.0,.14,-999.0,
-.74,-.0121,.0099,-.0149,.0046,2.3,-18.9,.006,.129,2.25,-999.0,'CPI',22-JAN-99
```

The following are wrapped versions of data records from a sample moving window data file on the CD-ROM:

```
SPATIAL_COVERAGE,RUN_START_DATE,RUN_START_TIME,RUN_END_DATE,RUN_END_TIME,
FLUX_MISSION_DESIGNATOR,FLUX_MISSION_NUM,FLUX_PASS_NUM,FLUX_SEGMENT_NUM,
START_LATITUDE,START_LONGITUDE,END_LATITUDE,END_LONGITUDE,START_BOREAS_X,
START_BOREAS_Y,END_BOREAS_X,END_BOREAS_Y,HEADING,MEAN_PRESS_ALTITUDE,
MEAN_RADAR_ALTITUDE,MEAN_WIND_DIR,MEAN_WIND_SPEED,MEAN_AIR_TEMP,
MEAN_POTNTL_TEMP,MEAN_H2O_MIX_RATIO,MEAN_U_COMPNT_WIND_VELOC,
MEAN_V_COMPNT_WIND_VELOC,MEAN_STATIC_PRESS,MEAN_SURF_RAD_TEMP,
MEAN_DOWN_TOTAL_RAD,MEAN_UP_TOTAL_RAD,MEAN_DOWN_LONGWAVE_RAD,
MEAN_UP_LONGWAVE_RAD,MEAN_NET_RAD,MEAN_UP_PPFD,MEAN_DOWN_PPFD,MEAN_AUX_RAD,
MEAN_GREEN_INDEX,MEAN_CO2_CONC,MEAN_O3_CONC,MEAN_CH4_CONC,MEAN_SAT_SIM_CH1,
MEAN_SAT_SIM_CH2,MEAN_SAT_SIM_CH3,MEAN_SAT_SIM_CH4,SDEV_AIR_TEMP,
SDEV_POTNTL_TEMP,SDEV_H2O_MIX_RATIO,SDEV_U_COMPNT_WIND_VELOC,
SDEV_V_COMPNT_WIND_VELOC,SDEV_STATIC_PRESS,SDEV_SURF_RAD_TEMP,
SDEV_DOWN_TOTAL_RAD,SDEV_UP_TOTAL_RAD,SDEV_DOWN_LONGWAVE_RAD,
SDEV_UP_LONGWAVE_RAD,SDEV_NET_RAD,SDEV_UP_PPFD,SDEV_DOWN_PPFD,SDEV_AUX_RAD,
SDEV_GREEN_INDEX,SDEV_CO2_CONC,SDEV_O3_CONC,SDEV_CH4_CONC,SDEV_SAT_SIM_CH1,
SDEV_SAT_SIM_CH2,SDEV_SAT_SIM_CH3,SDEV_SAT_SIM_CH4,TREND_AIR_TEMP,
TREND_POTNTL_TEMP,TREND_H2O_MIX_RATIO,TREND_U_COMPNT_WIND_VELOC,
TREND_V_COMPNT_WIND_VELOC,TREND_STATIC_PRESS,TREND_SURF_RAD_TEMP,
TREND_DOWN_TOTAL_RAD,TREND_UP_TOTAL_RAD,TREND_DOWN_LONGWAVE_RAD,
TREND_UP_LONGWAVE_RAD,TREND_GREEN_INDEX,TREND_CO2_CONC,TREND_O3_CONC,
TREND_CH4_CONC,SDEV_VERT_GUST_RAW,SDEV_U_COMPNT_WIND_VELOC_RAW,
SDEV_V_COMPNT_WIND_VELOC_RAW,SDEV_ALONG_WIND_RAW,SDEV_CROSS_WIND_RAW,
SDEV_POTNTL_TEMP_RAW,SDEV_H2O_MIX_RATIO_RAW,SDEV_CO2_MIX_RATIO_RAW,
SDEV_O3_CONC_RAW,SDEV_CH4_CONC_RAW,SKEW_VERT_GUST_RAW,
SKEW_U_COMPNT_WIND_VELOC_RAW,SKEW_V_COMPNT_WIND_VELOC_RAW,SKEW_ALONG_WIND_RAW,
SKEW_CROSS_WIND_RAW,SKEW_POTNTL_TEMP_RAW,SKEW_H2O_MIX_RATIO_RAW,
SKEW_CO2_MIX_RATIO,SKEW_O3_CONC_RAW,SKEW_CH4_CONC_RAW,KURT_VERT_GUST_RAW,
```

KURT_U_COMPNT_WIND_VELOC_RAW,KURT_V_COMPNT_WIND_VELOC_RAW,KURT_ALONG_WIND_RAW,
KURT_CROSS_WIND_RAW,KURT_POTNTL_TEMP_RAW,KURT_H2O_MIX_RATIO_RAW,
KURT_CO2_MIX_RATIO_RAW,KURT_O3_CONC_RAW,KURT_CH4_CONC_RAW,
CORC_VERT_U_WIND_COMPNT_RAW,CORC_VERT_V_WIND_COMPNT_RAW,
CORC_VERT_ALONG_WIND_RAW,CORC_VERT_CROSS_WIND_RAW,CORC_VERT_POTNTL_TEMP_RAW,
CORC_VERT_H2O_MIX_RATIO_RAW,CORC_VERT_CO2_MIX_RATIO_RAW,CORC_VERT_O3_CONC_RAW,
CORC_VERT_CH4_CONC_RAW,CORC_POTNTL_H2O_MIX_RATIO_RAW,
MMNTM_FLUX_V_WIND_COMPNT_RAW,MMNTM_FLUX_U_WIND_COMPNT_RAW,
MMNTM_FLUX_ALONG_MEAN_WIND_RAW,MMNTM_FLUX_CROSS_MEAN_WIND_RAW,
SENSIBLE_HEAT_FLUX_RAW,LATENT_HEAT_FLUX_RAW,CO2_FLUX_RAW,O3_FLUX_RAW,
O3_DEPOSITION_VELOC_RAW,CH4_FLUX_RAW,AIR_DENSITY_CONSTANT,
SPECIFIC_HEAT_CONSTANT,LATENT_HEAT_VAP_CONSTANT,DRY_AIR_GAS_CONSTANT,
SDEV_VERT_GUST_DET,SDEV_U_COMPNT_WIND_VELOC_DET,SDEV_V_COMPNT_WIND_VELOC_DET,
SDEV_ALONG_WIND_DET,SDEV_CROSS_WIND_DET,SDEV_POTNTL_TEMP_DET,
SDEV_H2O_MIX_RATIO_DET,SDEV_CO2_MIX_RATIO,SDEV_O3_CONC_DET,SDEV_CH4_CONC_DET,
SKEW_VERT_GUST_DET,SKEW_U_COMPNT_WIND_VELOC_DET,SKEW_V_COMPNT_WIND_VELOC_DET,
SKEW_ALONG_WIND_DET,SKEW_CROSS_WIND_DET,SKEW_POTNTL_TEMP_DET,
SKEW_H2O_MIX_RATIO_DET,SKEW_CO2_MIX_RATIO_DET,SKEW_O3_CONC_DET,
SKEW_CH4_CONC_DET,KURT_VERT_GUST_DET,KURT_U_COMPNT_WIND_VELOC_DET,
KURT_V_COMPNT_WIND_VELOC_DET,KURT_ALONG_WIND_DET,KURT_CROSS_WIND_DET,
KURT_POTNTL_TEMP_DET,KURT_H2O_MIX_RATIO_DET,KURT_CO2_MIX_RATIO_DET,
KURT_O3_CONC_DET,KURT_CH4_CONC_DET,CORC_VERT_U_WIND_COMPNT_DET,
CORC_VERT_V_WIND_COMPNT_DET,CORC_VERT_ALONG_WIND_DET,CORC_VERT_CROSS_WIND_DET,
CORC_VERT_POTNTL_TEMP_DET,CORC_VERT_H2O_MIX_RATIO_DET,
CORC_VERT_CO2_MIX_RATIO_DET,CORC_VERT_O3_CONC_DET,CORC_VERT_CH4_CONC_DET,
CORC_POTNTL_H2O_MIX_RATIO_DET,MMNTM_FLUX_U_WIND_COMPNT_DET,
MMNTM_FLUX_V_WIND_COMPNT_DET,MMNTM_FLUX_ALONG_MEAN_WIND_DET,
MMNTM_FLUX_CROSS_MEAN_WIND_DET,SENSIBLE_HEAT_FLUX_DET,LATENT_HEAT_FLUX_DET,
CO2_FLUX_DET,O3_FLUX_DET,O3_DEPOSITION_VELOC_DET,CH4_FLUX_DET,CRTFCN_CODE,
REVISION_DATE
'SSA',21-JUL-94,170545,21-JUL-94,171142,'RT',1,1,1,53.5615,-106.518,53.694,
-105.969,296.59,294.5,331.79,311.7,68.2,620.1,99.5,232.6,6.35,22.74,301.09,
10.25,5.05,3.85,94.09,23.4,760.3,86.3,356.3,452.9,577.4,-999.0,-999.0,-999.0,
-.79,329.0,29.75,-999.0,-999.0,-999.0,-999.0,-999.0,.3,.15,.51,1.07,1.06,3.2,
2.16,29.2,25.9,3.4,4.8,-999.0,-999.0,-999.0,-999.0,-999.0,3.8,1.24,-999.0,
-999.0,-999.0,-999.0,-999.0,-.00001122,.000000944,-.000003972,.00001363,
.00001966,-.0001354,-.00009248,.001071,.0001544,-.0001803,-.00003765,-999.0,
.0002895,-.0000837,-999.0,.79,1.07,1.06,1.14,.98,.15,.51,3.8,1.24,-999.0,.19,
-.07,-.3,-.21,-.4,1.07,-.44,.59,-.07,-999.0,2.97,3.03,3.12,3.09,3.11,5.71,3.94,
1.93,2.27,-999.0,-.31,-.21,-.35,-.03,.4,.36,-.1,-.21,-999.0,0.0,-.2624,-.1721,
-.3128,-.0244,60.7,395.5,-11.057,-.207,-16.68,-999.0,1.108,1013.6,2445883,
287.04,.79,1.06,1.04,1.11,.98,.15,.51,1.9,.79,-999.0,.19,-.1,-.24,-.26,-.36,
1.17,-.4,.05,-.13,-999.0,2.97,3.09,3.02,3.17,3.07,5.93,3.82,2.77,3.62,-999.0,
-.31,-.21,-.36,-.03,.4,.36,-.19,-.34,-999.0,0.0,-.2623,-.1719,-.3126,-.0243,
60.5,395.4,-10.946,-.208,-26.4,-999.0,'CPI',22-JAN-99

8. Data Organization

8.1 Data Granularity

The smallest orderable data set available is one file of flux runs during a day. Note that although there are less than 100 records in any data file, there are over 170 columns of data. Most spreadsheet software should be able to handle up to 256 columns of data.

8.2 Data Format(s)

The Compact Disk-Read-Only Memory (CD-ROM) files contain ASCII numerical and character fields of varying length separated by commas. The character fields are enclosed with single apostrophe marks. There are no spaces between the fields.

Each data file on the CD-ROM has four header lines of Hyper-Text Markup Language (HTML) code at the top. When viewed with a Web browser, this code displays header information (data set title, location, date, acknowledgments, etc.) and a series of HTML links to associated data files and related data sets. Line 5 of each data file is a list of the column names, and line 6 and following lines contain the actual data.

9. Data Manipulations

9.1 Formulae

None given.

9.1.1 Derivation Techniques and Algorithms

None given.

9.2 Data Processing Sequence

9.2.1 Processing Steps

The following steps were used to process these data:

- AFM-03 processed data and sent it to BORIS.
- BORIS staff received the data, made necessary conversions to standard units, and loaded the data into data base.
- BORIS staff documented the data set and compiled basic statistics about data.

9.2.2 Processing Changes

None given.

9.3 Calculations

9.3.1 Special Corrections/Adjustments

None given.

9.3.2 Calculated Variables

See lists of variables in Sections 7.1 and 7.3.

9.4 Graphs and Plots

None.

10. Errors

10.1 Sources of Error
None given.

10.2 Quality Assessment

10.2.1 Data Validation by Source
None given.

10.2.2 Confidence Level/Accuracy Judgment
BORIS staff checked the data to make sure that they were loaded properly.

10.2.3 Measurement Error for Parameters
None given.

10.2.4 Additional Quality Assessments
None given.

10.2.5 Data Verification by Data Center
Data were examined for general consistency and clarity.

11. Notes

11.1 Limitations of the Data
None given.

11.2 Known Problems with the Data
None given.

11.3 Usage Guidance
Note that although there are less than 100 records in any data file, there are over 170 columns of data. Most spreadsheet software should be able to handle up to 256 columns of data.

11.4 Other Relevant Information
None given.

12. Application of the Data Set

These data can be used to obtain study area and regional scale estimates of the various fluxes.

13. Future Modifications and Plans

None given.

14. Software

14.1 Software Description

None given.

14.2 Software Access

None given.

15. Data Access

The NCAR Electra 1994 aircraft flux and moving window data are available from the Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

15.1 Contact Information

For BOREAS data and documentation please contact:

ORNL DAAC User Services
Oak Ridge National Laboratory
P.O. Box 2008 MS-6407
Oak Ridge, TN 37831-6407
Phone: (423) 241-3952
Fax: (423) 574-4665
E-mail: ornldaac@ornl.gov or ornl@eos.nasa.gov

15.2 Data Center Identification

Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) for Biogeochemical Dynamics http://www-eosdis.ornl.gov/ [Internet Link].

15.3 Procedures for Obtaining Data

Users may obtain data directly through the ORNL DAAC online search and order system [http://www-eosdis.ornl.gov/] and the anonymous FTP site [ftp://www-eosdis.ornl.gov/data/] or by contacting User Services by electronic mail, telephone, fax, letter, or personal visit using the contact information in Section 15.1.

15.4 Data Center Status/Plans

The ORNL DAAC is the primary source for BOREAS field measurement, image, GIS, and hardcopy data products. The BOREAS CD-ROM and data referenced or listed in inventories on the CD-ROM are available from the ORNL DAAC.

16. Output Products and Availability

16.1 Tape Products

Not applicable.

16.2 Film Products

Not applicable.

16.3 Other Products

These data are available on the BOREAS CD-ROM series.

17. References

17.1 Platform/Sensor/Instrument/Data Processing Documentation

Airborne Humidity Measurements. 1987. NCAR Research Aviation Facility Bull. No. 22, Boulder, CO.

Bannehr, L. and V. Glover. 1992. A spectral vegetation radiometer for airborne boundary-layer research. NCAR Technical Note, NCAR/TN-370+STR, 39 pp.

Baumgardner, D. 1989. Airborne measurements for cloud microphysics. NCAR Research Aviation Facility Bull. No. 24, Boulder, CO.

Betts, A.K., R.L. Desjardins, J.I. MacPherson, and R.D. Kelly. 1990. Boundary-Layer heat and moisture budgets from FIFE. Boundary-Layer Meteorology 50(1-4):109-137.

Flight Planning: The NCAR Electra. 1993. NCAR Research Aviation Facility Bull. No. 7, Boulder, CO.

Glover, V. and L. Bannehr. 1993. Radiation measurements from NCAR aircraft. NCAR Research Aviation Facility Bull. No. 25, Boulder, CO.

Lenschow, D.H. (ed.). 1986. Probing the Atmospheric Boundary Layer, Amer. Meteor. Soc., Boston.

Lenschow, D.H. and P. Spyers-Duran. 1989. Measurement Techniques: Air motion sensing. NCAR Research Aviation Facility Bull. No. 23, Boulder, CO.

Stull, R.B. 1988. An Introduction to Boundary Layer Meteorology. Kluwer Acad. Pub., Boston.

17.2 Journal Articles and Study Reports

Davis, K.J., D.H. Lenschow, S.P. Oncley, C. Kiemle, G. Ehret, A. Giez, and J. Mann. 1997. Role of entrainment in surface-atmosphere interactions over the boreal forest. Journal of Geophysical Research 102(D24):29,219-29,230.

Dobosy, R.J., T.L. Crawford, J.I. MacPherson, R.L. Desjardins, R.D. Kelly, S.P. Oncley, and D.H. Lenschow. 1997. Intercomparison among four flux aircraft at BOREAS in 1994. Journal of Geophysical Research 102(D24):29,101-29,111.

Kiemle, C., G. Ehret, A. Giez, K.J. Davis, D.H. Lenschow, and S.P. Oncley. 1996. Estimating of boundary-layer humidity fluxes and statistics from airborne DIAL. Institut fur Physik der Atmosphare, Report No. 64, DLR-Oberpfaffenhofen, Germany, 36 pp.

Kiemle, C., G. Ehret, A. Giez, K.J. Davis, D.H. Lenschow, and S.P. Oncley. 1997. Estimation of boundary layer humidity fluxes and statistics from airborne differential absorption lidar (DIAL). Journal of Geophysical Research 102(D24): 29,189-29,203.

Lenschow, D.H., Q. Wang, S.P. Oncley, K.J. Davis, and J. Mann. 1996. Lake-induced modification of the boundary layer over the boreal forest. 22nd Conference on Agricultural and Forest Meteorology, Atlanta, GA, Jan. 28-Feb. 2, American Meteorological Society.

Mann, J., K.J. Davis, D.H. Lenschow, S.P. Oncley, C. Kiemle, G. Ehret, A. Giez, and H.G. Schreiber. 1995. Airborne observations of the boundary layer top, and associated gravity waves and boundary layer structure. Ninth Symp. on Met. Obs. and Instrum., Amer. Met. Soc., Boston, MA.

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. 2000. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM.

Oncley, S.P., D.H. Lenschow, K.J. Davis, T. Campos, and J. Mann. 1996. Regional-scale surface flux observations across the boreal forest during BOREAS. 22nd Conference on Agricultural and Forest Meteorology, Atlanta, GA, Jan. 28-Feb. 2, American Meteorological Society.

Oncley, S.P., D.H. Lenschow, T.L. Campos, K.J. Davis, and J. Mann. 1997. Regional-scale surface flux observations across the boreal forest during BOREAS. Journal of Geophysical Research 102(D24): 29,147-29,154.

Sellers, P. and F. Hall. 1994. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1994-3.0, NASA BOREAS Report (EXPLAN 94).

Sellers, P. and F. Hall. 1996. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1996-2.0, NASA BOREAS Report (EXPLAN 96).

Sellers, P., F. Hall, and K.F. Huemmrich. 1996. Boreal Ecosystem-Atmosphere Study: 1994 Operations. NASA BOREAS Report (OPS DOC 94).

Sellers, P., F. Hall, and K.F. Huemmrich. 1997. Boreal Ecosystem-Atmosphere Study: 1996 Operations. NASA BOREAS Report (OPS DOC 96).

Sellers, P., F. Hall, H. Margolis, B. Kelly, D. Baldocchi, G. den Hartog, J. Cihlar, M.G. Ryan, B. Goodison, P. Crill, K.J. Ranson, D. Lettenmaier, and D.E. Wickland. 1995. The boreal ecosystem-atmosphere study (BOREAS): an overview and early results from the 1994 field year. Bulletin of the American Meteorological Society. 76(9):1549-1577.

Sellers, P.J., F.G. Hall, R.D. Kelly, A. Black, D. Baldocchi, J. Berry, M. Ryan, K.J. Ranson, P.M. Crill, D.P. Lettenmaier, H. Margolis, J. Cihlar, J. Newcomer, D. Fitzjarrald, P.G. Jarvis, S.T. Gower, D. Halliwell, D. Williams, B. Goodison, D.E. Wickland, and F.E. Guertin. 1997. BOREAS in 1997: Experiment Overview, Scientific Results and Future Directions. Journal of Geophysical Research 102(D24): 28,731-28,770.

17.3 Archive/DBMS Usage Documentation

None.

18. Glossary of Terms

None given.

19. List of Acronyms

AFM	- Airborne Fluxes and Meteorology
AGL	- Above Ground Level
ASCII	- American Standard Code for Information Interchange
ATD	- Atmospheric Technology Division of NCAR
BOREAS	- BOReal Ecosystem-Atmosphere Study
BORIS	- BOREAS Information System
CD-ROM	- Compact Disk-Read-Only Memory
DAAC	- Distributed Active Archive Center
EOS	- Earth Observing System
EOSDIS	- EOS Data and Information System
GIS	- Geographic Information System
GMT	- Greenwich Mean Time
GPS	- Global Positioning System
GSFC	- Goddard Space Flight Center
HTML	- HyperText Markup Language
INS	- Inertial Navigation System
IRS	- Inertial Reference System
MMM	- Mesoscale and Microscale Research Division, NCAR
NAD83	- North American Datum of 1983
NASA	- National Aeronautics and Space Administration
NCAR	- National Center for Atmospheric Research
NDVI	- Normalized Difference Vegetation Index
NRC	- National Research Council, Canada
NSA	- Northern Study Area
OA	- Old Aspen
ORNL	- Oak Ridge National Laboratory
PANP	- Prince Albert National Park
PPFD	- Photosynthetic Photon Flux Density
RAF	- Research Aviation Facility, NCAR
SSA	- Southern Study Area
SSSF	- Sounding and Surface System Facility, NCAR
TF	- Tower Flux
URL	- Uniform Resource Locator
UTC	- Universal Time Code

20. Document Information

20.1 Document Revision Date

Written: 16-Jul-1996
Last Updated: 08-Oct-1999

20.2 Document Review Date(s)

BORIS Review: 08-Feb-1999
Science Review:

20.3 Document ID

20.4 Citation

When using these data, please contact the personnel listed in Section 2.3 as well as citing relevant papers in Section 17.2

If using data from the BOREAS CD-ROM series, also reference the data as:

Lenschow, D.H., "Airborne Investigation of Biosphere-Atmosphere Interactions over the Boreal Forest." In Collected Data of The Boreal Ecosystem-Atmosphere Study. Eds. J. Newcomer, D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers. CD-ROM. NASA, 2000.

Also, cite the BOREAS CD-ROM set as:

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM. NASA, 2000.

20.5 Document Curator

20.6 Document URL

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
June 2000

3. REPORT TYPE AND DATES COVERED
Technical Memorandum

4. TITLE AND SUBTITLE
Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)
BOREAS AFM-03 Electra 1994 Aircraft Flux and Moving Window Data

5. FUNDING NUMBERS
923
RTOP: 923-462-33-01

6. AUTHOR(S)
Donald H. Lenschow, Al Shanot, Steven P. Oncley, and Al Cooper
Forrest G. Hall and David E. Knapp, Editors

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS (ES)
Goddard Space Flight Center
Greenbelt, Maryland 20771

8. PEFORMING ORGANIZATION REPORT NUMBER
2000-03136-0

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES)
National Aeronautics and Space Administration
Washington, DC 20546-0001

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
TM—2000–209891
Vol. 4

11. SUPPLEMENTARY NOTES
D.H. Lenschow, A. Shanot, S. P. Oncley, and A. Cooper: National Center for Atmospheric Research (NCAR); David E. Knapp: Raytheon ITSS

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Unclassified–Unlimited
Subject Category: 43
Report available from the NASA Center for AeroSpace Information,
7121 Standard Drive, Hanover, MD 21076-1320. (301) 621-0390.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The BOREAS AFM-3 team used the NCAR Electra aircraft data to make measurements of the fluxes of momentum, sensible and latent heat, carbon dioxide, and ozone over the entire BOREAS region to tie together measurements made in both the SSA and the NSA in 1994. These data were also used to study the planetary boundary layer using both in situ and remote sensing measurements. This data set contains both the aircraft flux and the moving window data. These data are stored in tabular ASCII files.

14. SUBJECT TERMS
BOREAS, airborne flux and meteorology, moving window data.

15. NUMBER OF PAGES
51

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL